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Social Mobility Or Social Stratification? Exploring The Relationship Between Public Policy Intervention And Outcomes At Minority Serving Institutions

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Abstract

Minority serving institutions (MSIs) are becoming an increasingly prominent part of U.S. postsecondary education and perform a critical role in educating and graduating students of color. These institutions receive discretionary and mandatory funding via the Higher Education Act to better serve their focal student populations. While a growing corpus of research illuminates the strengths of MSIs, few studies have focused on the possible relationship between MSI federal grants and student outcomes. This study incorporates institution-level Department of Education NCES data and Equality of Opportunity Project data with a regression discontinuity design to estimate the impact of Title III and Title V grants on college completion measures as well as upward social mobility measures. The results from this study indicate a positive relationship between institutions receiving MSI grant funding and institutional outcome metrics net of other variables. The relationship is particularly strong amongst Latino/a students graduating from HSIs. Implications for policy and practice as well as directions for future research are also discussed.

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SOCIAL MOBILITY OR SOCIAL STRATIFICATION? EXPLORING THE RELATIONSHIP BETWEEN PUBLIC POLICY INTERVENTION AND OUTCOMES AT MINORITY SERVING INSTITUTIONS

William Casey Boland

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ACKNOWLEDGMENT

A variety of unexpected twists and turns along the highway of life led me in pursuit of a PhD. Few of those attending a performance in my previous life as a touring musician would ever imagine me obtaining a doctoral degree (though I always looked the part). Yet those experiences somehow deposited me at a temp administrative assistant position at Rutgers University that then transported me to an administrative coordinator position with the Jerome Fisher Program in Management & Technology at the University of Pennsylvania. This allowed me to enroll in graduate-level courses and my first choice was Marybeth Gasman's History of Higher Education. This class convinced me to become a professor, a researcher, a teacher, and not a college administrator.

I met with Marybeth towards the end of that semester. I told her I wanted to apply for the master's program (as I was a lowly general admit at that point). She said I would have no trouble getting accepted. I told her I wanted to get a master's degree and then pursue a PhD. She asked if I was awesome. I responded, 'Um, I don't know, sure.' She declared: "Then you will get in." Though far from amazing, I convinced Marybeth to be my advisor. I owe a weighty debt of gratitude to Marybeth for her unwavering support and constant inspiration.

After beginning the master's, I met Joni Finney during by her finance class. Her Advanced Public Policy Research Seminar made me a convert to the study of public policy. Joni has been instrumental in my research focus. She's been a trusted friend and mentor since. I've admired Nick Hillman and his research since seeing him speak at my

first ASHE in 2013. Despite declining an invitation to work with Nick as a PhD student at the University of Wisconsin-Madison, he has continued to be unbelievably gracious with his time and insight. Marybeth, Joni, and Nick not only comprise my dissertation committee- they are the three most influential mentors in my journey and I can't thank them enough.

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Through it all, my wife Lisa has given me more support than any spouse should. She's endured my struggles and seven-day weeks of work for months on end. Many doctoral students I've known have hit rocky terrain in relationships given the formidable demands on time and attention. Yet Lisa has been happy to accept a day out consisting of hours spent at a coffee shop while we work together. I could never have begun a PhD or neared the doctoral finish line without her unwavering support and inspiration.

ABSTRACT

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Minority serving institutions (MSIs) are becoming an increasingly prominent part of U.S. postsecondary education and perform a critical role in educating and graduating students of color. These institutions receive discretionary and mandatory funding via the Higher Education Act to better serve their focal student populations. While a growing corpus of research illuminates the strengths of MSIs, few studies have focused on the possible relationship between MSI federal grants and student outcomes. This study incorporates institution-level Department of Education NCES data and Equality of Opportunity Project data with a regression discontinuity design to estimate the impact of Title III and Title V grants on college completion measures as well as upward social mobility measures. The results from this study indicate a positive relationship between institutions receiving MSI grant funding and institutional outcome metrics net of other variables. The relationship is particularly strong amongst Latino/a students graduating from HSIs. Implications for policy and practice as well as directions for future research are also discussed.

TABLE OF CONTENTS

ACKNOWLEDGMENT iii

ABSTRACT v

LIST OF TABLES vii

CHAPTER 1: INTRODUCTION 1

CHAPTER 2: LITERATURE REVIEW 10

- Social Mobility 11
- MSI Access, Attainment, and Return on Investment 13
- Higher Education Finance 20
- Social Stratification 30
- Guiding Theoretical Perspectives 35

CHAPTER 3: RESEARCH DESIGN 38

- Analytic Sample and Data 38
- Dependent Variables 41
- Independent Variables 43
- Estimation Strategy 45
- Estimation Procedures 46
- Analysis 50
- Sensitivity Analysis 53
- Limitations 54

CHAPTER 4: RESULTS 57

- Descriptive Statistics 57
- Title V: College Completion 66
- Title III: College Completion 86
- Title V: Upward Social Mobility 104

CHAPTER 5: DISCUSSION AND CONCLUSION 114

- Title V funding leads to increase in college completion 116
- Title III funding led to increase in college completion 119
- Title V leads to increase upward social mobility 123
- Contributions of this study 125
- Recommendations for Policy and Practice 125
- Recommendations for Future Research 127
- Conclusion 128

APPENDIX 130

BIBLIOGRAPHY 134

LIST OF TABLES

Table 1. Title III and Title V Legislation & Eligibility……..……..….3

Table 2. Total Title III and Title V funding to MSIs…….……5

Table 3. Examples of HEA Title III and V MSI Grant-Funded Projects……..6

Table 4. MSI categories by sector……55

Table 5. Average of dependent variables included in Title V analysis, 2000-2006…55

Table 6. Average of control variables included in Title V analysis, public four-year institutions, 2000-2006…….……57

Table 7. Average of control variables included in Title V analysis, private four-year institutions, 2000-2006……..…58

Table 8. Average of control variables included in Title V analysis, public two-year institutions, 2000-2006……..…59

Table 9. Average of dependent variables included in Title III analysis, 2007-2015....60

Table 10. Average of control variables included in Title III analysis, public four-year institutions, 2007-2015…….……61

Table 11. Average of control variables included in Title III analysis, private four-year institutions, 2007-2015…….……62

Table 12. Average of control variables included in Title III analysis, public two-year institutions, 2007-2015…….……63

Table 13. Average of dependent variables included in Title V upward social mobility analysis, 2010-2012…….……64

Table 14. Fuzzy regression discontinuity estimates of the effect of Title V on all races and ethnicities and all credentials by sector……65

Table 15. Fuzzy regression discontinuity estimates of the effect of Title V on all races and ethnicities by credential and sector……..……68

Table 16. Fuzzy regression discontinuity estimates of the effect of Title V on all Latino/a completers by credential and sector……71

Table 17. Fuzzy regression discontinuity estimates of the effect of Title V on all Asian American and Pacific Islander completers by credential and sector…74

Table 18. Fuzzy regression discontinuity estimates of the effect of Title V on all American Indian and Alaska Native completers by credential and sector……..…77

Table 19. Fuzzy regression discontinuity estimates of the effect of Title V on all Black and African American completers by credential and sector……..79

Table 20. Fuzzy regression discontinuity estimates of the effect of Title V on all White, non-Hispanic completers by credential and sector……82

Table 21. Fuzzy regression discontinuity estimates of the effect of Title V on all Non-resident Student Alien completers by credential and sector……..84

Table 22. Fuzzy regression discontinuity estimates of the effect of Title III on all races and ethnicities and all credentials by sector……...…87

Table 23. Fuzzy regression discontinuity estimates of the effect of Title III on all races and ethnicities by credential and sector……89

Table 24. Fuzzy regression discontinuity estimates of the effect of Title III on all Latino/a completers by credential and sector…….….93

Table 25. Fuzzy regression discontinuity estimates of the effect of Title III on all Asian American and Pacific Islander completers by credential and sector.…95

Table 26. Fuzzy regression discontinuity estimates of the effect of Title III on all American Indian and Alaska Native completers by credential and sector……..……98

Table 27. Fuzzy regression discontinuity estimates of the effect of Title III on all Black and African American completers by credential and sector……..…100

Table 28. Fuzzy regression discontinuity estimates of the effect of Title III on all White, non-Hispanic completers by credential and sector……..…….103

Table 29. Fuzzy regression discontinuity estimates of the effect of Title III on all Non-resident Student Alien completers by credential and sector……107

Table 30. Fuzzy regression discontinuity estimates of the effect of Title V on upward social mobility, increase by two income quintiles and first to fifth income quintiles……..……..……110

Table 31. Fuzzy regression discontinuity estimates of the effect of Title V on upward social mobility, first to fourth and first to third income quintiles…..112

Table 32. Fuzzy regression discontinuity estimates of the effect of Title V on upward social mobility, second to fourth and second to fifth income quintiles…….,,,

CHAPTER 1: INTRODUCTION

Generations have believed in the perception and the reality of the American Dream. This concept has arguably been the most enduring and intrinsic characteristic to what it means to be a citizen of the United States. Though definitions may vary, most would agree that the American Dream is the economic process of upward income mobility. It is the concept that children can and should enjoy a higher standard of living than their parents. Since the middle of the 20th century, a college degree exists in the minds of many as the key to unlocking the door to the American Dream and achieving at minimum a middle class standard of living. Yet children's prospects of earning more than their parents have fallen from 90 percent to 50 percent over the past half century. Given the decline in aggregate income mobility, it is critical to assess how specific postsecondary institutions and public policies serve students. This study is an attempt to explore a federal public policy arguably adopted and implemented to serve an equity agenda.

The shifting demographics of the United States are changing the shape of higher education to come. As of 2011, more people of color were born in the U.S. than Whites. The White population is projected to become a minority by the middle of the 21st century. The demographic changes have already led to friction, particularly at the levels of state and federal politics. These changes are both racial and generational in nature. White is not the future of the U.S. Births of Asian American and Pacific Islanders and Latino/as already outpace Whites. Between 1980 and 2010, the U.S. population grew by 40 percent. Asian American and Pacific Islanders increased nearly 335 percent, Latino/a by

246 percent, American Indian and Alaska Native by 106 percent, Black and African Americans by 50 percent, and Whites by 29 percent (Conrad & Gasman, 2015). Despite the demographic changes, the political reality has not caught up with the demographic reality. There is a cultural generational gap between policymakers and the residents of an increasing number of U.S. states. Though the tension is often criticized as the manifestation of festering racist attitudes, Frey (2015) argues, "It reflects the social distance between minority youth and an older population that does not feel a personal connection with young adults and children who are not 'their' children and grandchildren" (p. 7). The growing populations of color throughout the U.S. portend in increase in the number of minority serving institutions (MSIs).

MSIs compromise more than 600 postsecondary colleges and universities in the U.S. and U.S. territories. MSIs accounted for approximately 15 percent of all postsecondary institutions and enrolled 26 percent of all college students in 2013-2014 (about 3.8 million students) (Gasman & Conrad, 2013; Montenegro & Jankowski, 2015; U.S. Department of Education, 2014). MSIs served approximately 40 percent of underrepresented students totaling approximately 3.8 million students in the same academic year (U.S. Department of Education, 2014). MSIs were initially founded in response to the exclusion of racial minorities from U.S. colleges and universities. An institution can be designed as an MSI if a percentage of the student population exceeds a particular number (usually 25 percent) and is then eligible for federal funding. Historically Black Colleges and Universities (HBCUs) and Tribal Colleges and Universities (TCUs)- the original MSIs- educated students of color who were forbidden

an education in the traditional colleges and universities of the day. MSIs continue to provide an education to all students regardless of race and ethnicity.

Since an institution can become an MSI after meeting two benchmarks (the percentage of enrollment that is a particular population of color and the percentage that receives Pell Grants), it is certain that the number of MSIs will rise given the increase in populations of color. Table 1 displays the eligibility criteria and legislation for the MSI categories included in this study.

Table 1:

Title III and Title V Legislation & Eligibility

MSI Designation	Department of Education Legislation	Eligibility (racial)	Eligibility (income)
Alaska Native Native Hawaiian Serving Institutions	§317(b) of the HEA, 20 U.S.C. §1059d(b)	20% Alaska Native students/10% Native Hawaiian students	
Asian American Native American Pacific Islander Serving Institutions	§§ 320(b) and 371(c)(2) of the HEA, 20 U.S.C. §§1059g(b) and 1067q(c)(2)	10% Asian American and Native American Pacific Islander students	50% low income
Historically Black Colleges & Universities	Part B of the HEA, 20 U.S. Code § 1067q		
Hispanic Serving Institutions	§502 of the HEA, 20 U.S.C. §1101a	25% Hispanic students	50% low income
Native American Non-Tribal Serving Institutions	§§319(b) and 371(c)(8) of the HEA; 20 U.S.C. §§ 1059f(b) and 1067q(c)(8)	10% Native American students	
Predominantly Black Institutions	§§318(b) and 371(c)(9) of the HEA; 20 U.S.C. §§ 1059e(b) and 1067q(c)(9)	40% Black students	50% low income
Tribal Colleges & Universities	§316 of the HEA, 20 U.S.C. §1059c		

Source: U.S. Department of Education, Office of Postsecondary Education

The federal government formally recognized MSIs with the Higher Education Act of 1965. Under Title III, HBCUs began receiving federal funding (Gasman and Conrad, 2013; U.S. Department of Education, 2013). TCUs were appropriated funding by the federal government beginning in 1994 (Stull, Spyridakis, Gasman, Samayoa, & Booker, 2015). HBCUs and TCUs were founded specifically to educate African American and Native American student populations respectively. Additional classifications of postsecondary institutions as MSIs developed to address the increasing presence of students of color and low-income students in many colleges and universities throughout the U.S. Eligibility criteria for such federal funding occurred first for HSIs in 1998. Other categories followed with the passage of the College Cost Reduction and Access Act in 2007 (Stull, Spyridakis, Gasman, Samayoa, & Booker, 2015).

MSIs receive federal funding through Titles III and V of the Higher Education Act. These include mandatory and discretionary components, with grants for all MSI categories besides HBCUs and TCUs being competitive. Many categories of MSIs can also apply for cooperative grants between multiple institutions, though the lead institution must be designated as an MSI. There are numerous functions that can be funded through MSI grants. A common use of MSI federal funding is academic support. Another use of MSI funding is the purchase of scientific equipment or improving classrooms and libraries. Another popular utilization of federal funding is for instruction and curriculum development (Harmon, 2012). The federal government appropriated roughly $762 million to MSIs in fiscal year 2015 (Hegji, 2016). The overall purpose of MSI funding is

for these institutions to invest in the advancement of student success. As there is at this time no common definition of student success, institutions continue to devote this resource to a variety of projects. The goals of such projects could include an increase in student persistence or completion of a degree. Other programs may encourage students to advance from remedial education into college-level coursework (Boland, 2018).

Table 2:

Total Title III and Title V funding to MSIs

	2009	2010	2011	2012	2013	2014	2015
AANAPISI discretionary	$2,500,000	$3,600,000	$3,198,590	$2,731,369	$2,953,761	$3,001,488	$2,942,044
AANAPISI mandatory	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$4,731,162	$4,640,000
AANH discretionary	$11,579,000	$15,084,000	$13,412,000	$12,859,000	$12,186,000	$12,622,000	$12,833,000
AANH mandatory	$15,000,000	$15,000,000	$15,000,000	$15,000,000	$14,235,000	$13,920,000	$13,905,000
HSI discretionary	$93,256,000	$117,429,000	$104,395,000	$100,432,000	$95,179,000	$98,583,000	$100,231,000
HSI mandatory	-	-	-	-	-	-	-
HSI_III d	-	-	-	-	-	-	-
HSI_III m	-	$100,000,000	$100,000,000	$100,000,000	$94,900,000	$92,800,000	$92,700,000
NASNTI discretionary	$0	$3,600,000	$3,199,000	$3,199,000	$2,956,000	$3,062,000	$3,348,000
NASNTI mandatory	$5,000,000	$5,000,000	$5,000,000	$5,000,000	$4,745,000	$4,640,000	$4,660,000
PBI discretionary	$0	$10,801,000	$9,262,000	$8,778,000	$9,092,000	$9,244,000	$9,942,000
PBI mandatory	$15,000,000	$15,000,000	$15,000,000	$14,235,000	$13,920,000	$13,905,000	$13,980,000
HBCU discretionary	$238,095,000	$266,568,000	$227,980,000	$216,056,000	$223,783,000	$227,524,000	$244,694,000
HBCU mandatory	$85,000,000	$85,000,000	$85,000,000	$80,665,000	$78,880,000	$78,795,000	$79,220,000
TCU discretionary	$23,158,000	$30,169,000	$25,713,000	$24,368,000	$25,239,000	$25,662,000	$27,599,000
TCU mandatory	$30,000,000	$30,000,000	$30,000,000	$28,470,000	$27,840,000	$27,810,000	$27,960,000
Discretionary total	$368,588,000	$447,251,000	$387,159,590	$368,423,369	$371,388,761	$379,698,488	$401,589,044
Mandatory total	$155,000,000	$155,000,000	$155,000,000	$148,370,000	$144,620,000	$143,801,162	$144,365,000
Total	$523,588,000	$702,251,000	$642,159,590	$616,793,369	$610,908,761	$616,299,650	$638,654,044

Source: Hegji, A. (2016). Programs for Minority-Serving Institutions Under the Higher Education Act. Congressional Research Service.

Institutions submit project abstracts to the Office of Postsecondary Education. There is a two-step process for institutions to received federal funding as an MSI. First, an institution must submit an application to be considered eligible to apply for a federal MSI grant. Once granted permission, the institution then applies for a grant. The project abstract is part of that process. The project abstract outlines what an institution intends to do with the grant and in most cases, the desired results. Project abstracts often include

information required for eligibility: total enrollment, number of Pell recipients, number of part-time students, and total core expenses (U.S. Department of Education, n.d.). Though not required, project abstracts can include specific numeric targets for intended outcomes of the MSI program.

Table 3:

Examples of HEA Title III and V MSI Grant-Funded Projects

MSI Category	Institution	Program	Purpose	FY
AANAPISI	Evergreen Valley College	Southeast Asian American Student Excellence (SEAASE)	Recruit, prepare, and guide more Southeast Asian American (SEAA) students to seize the opportunity to enroll at Evergreen Valley College (EVC) and complete major steps toward their personal goals for academic excellence	2015
AANAPISI	Coastline Community College	New Asian American Pacific Islander (AAPI) Generation Initiative (NAAPIGI)	Improve the persistence and time to completion rates to match or exceed state averages for AAPI students. It will also seek to significantly increase the number of AAPI students who enroll full-time.	2015
ANNH	Chaminade University of Honolulu		Increasing the Academic Capacity of Chaminade University of Honolulu	2014
ANNH	Leeward Community College	Pa‘a Ke Kahua: Strengthening Our Foundation	Increase success, graduation and transfer rates at Leeward Community College by improving the quality of facilities and increasing access to laboratory equipment	2014
HSI	Mendocino-Lake Community College District	FYI - First Year Institute	implement research-based strategies to develop a college culture that promotes, expedites, and values student success among Hispanic and high-need students	2016
HSI	Bergen Community College	Pathway Scholars Program	Learning-enhancement and proactive advising strategies will be integrated through the Pathway Scholars Program (PSP) to support high-need Hispanic and low-income students as they transition from developmental to college-level courses	2016
NASNTI	Fort Lewis College		Address the needs of Native American students who are retaining and graduating at much lower rates than FLC students overall	2011
NASNTI	Northeastern Oklahoma A&M College	Merging Tradition and Technology to Create Access to High-Demand Careers	Distance delivery to increase postsecondary completion rates	2011
PBI	Community College of Philadelphia		Achieve higher levels of academic performance and persistence rates of African-American male members of the Center of Male Engagement	2009
PBI	Mississippi Delta Community College	PATHMAKERS	Assess, develop, and implement educational support and mentoring strategies to consistently increase the persistence rate among African-American males especially in the field of mathematics	2009

Source: U.S. Department of Education, Office of Postsecondary Education

I argue that Title III and Title V funding for MSIs represents an attempt to fulfill an equity agenda via public policy as manifested in postsecondary finance policy intervention. These policies target institutions enrolling a disproportionate composition of students of color and low-income students (Conrad & Gasman, 2015; Hegji, 2016). Through these policies, the federal government specifically distributes grants to institutions acknowledged to be financially disadvantaged (Hegji, 2016). The purpose of this study is to investigate if these policies achieve their purpose: enabling traditionally underserved students to earn a college credential and enjoy a higher standard of living.

MSIs are located in all sectors of higher education, though more tend to be these open-access institutions. A popular critique of open-access higher education institutions- those admitting the majority of applicants- is that they do a disservice to their students. Some researchers argue that students of color are especially harmed by enrolling in and graduating from this tier of college. Yet both old and new studies counter with empirical research findings of positive outcomes for students attending community colleges and less-selective four-year colleges (Chetty, Friedman, Saez, Turner, & Yagan, 2017). It is critical to empirically assess the efficacy of MSIs and other open-access institutions to determine if their graduates advance in terms of income mobility. Some researchers have argued that less selective institutions corral people of color in lower-wage employment. Sociologists have long critiqued U.S. higher education for maintaining systems of hierarchy grounded in race, ethnicity, and socioeconomic status (Grusky, 2014; Grodsky & Jackson, 2009; Stevens, Armstrong, & Arum, 2008). Yet more recent insight suggests

a more nuanced view of the mechanisms by which less selective institutions serve students is warranted (Chetty, Friedman, Saez, Turner, & Yagan, 2017).

This study contributes to the research literature on MSIs, college completion, upward social mobility, and federal public policy for higher education. It seeks to answer the following questions:

1. Is there a relationship between Title V and Title III funding for MSIs and college completion? Do outcomes vary between postsecondary sectors and across credentials?

2. Is there a relationship between Title V and Title III funding for MSIs and upward social mobility? Do MSIs contribute to the stratification of U.S. higher education by not increasing upward mobility for their students?

The federal government provides funding to institutions of higher education that serve a disproportionate share of students of color and lower income students to support the success of these students. The core assumption is that bolstering such institutions will enable them to better serve students. Also implicit in this federal policy intervention is that higher education should have as its primary mission the education and graduation of its students. It is essential to empirically determine if MSIs produce more students completing credentials as well as leading to an increase in upward mobility to better understand the impact of key Higher Education Act policies on traditionally underserved student populations. The results from this study could illuminate the impact of Title V and Title III grants on minimizing gaps in college completion and economic mobility based on race, ethnicity, and socioeconomic status.

CHAPTER 2: LITERATURE REVIEW

Examining MSI performance requires an analysis of federal higher education policy. Like all higher education institutions, MSIs are situated within the context of higher education in the state as well as overall federal policies for higher education. Higher education policy research has well demonstrated historical hurdles to enrollment for students of color (Perna & Kurban, 2013; St. John & Musoba, 2011). Education research has also analyzed why many who access higher education do not complete their education (St. John & Musoba, 2011). This research repeatedly connects the problems of access and attainment to increasing costs of education for students and families, declining purchasing power of financial aid, state disinvestment in higher education via diminished state appropriations, and lack of preparation in elementary and secondary education (Paulsen & Smart, 2001; Zumeta, Breneman, Callan, & Finney, 2012).

Despite the plethora of literature assessing state and federal higher education policy and the impact on individual institutions and students, little of it explores how such policies affect MSIs. Demographic shifts portend a substantial increase in the number of MSIs throughout the country in the near future. Studying how state and federal public policies affect MSIs- especially in terms of performance- is critical for state and nationwide efforts to address critical needs.

MSIs were born from a grassroots response to institutional and political neglect. MSIs are emblematic of an activist spirit and a communal desire to wrest the reins of education from a racist, hegemonic legacy. While the dominant narratives in education and higher education policy give primacy to issues of access and attainment for

"traditionally underrepresented/underserved communities," such research exists almost entirely in a contextual vacuum. Such research mostly frames access and attainment issues in economic terms, while ignoring notions of social justice or the important role of political influence. Enrolling Black, Hispanic, Native American, and other students of color appears more often as a matter of economic and workforce needs within most education policy studies, with little to no mention of how these populations have historically been intentionally, systematically, and purposely barred from postsecondary education. Additionally, there is no analysis or even cursory mention of the institutionalized racism that continues to create the social ills and education attainment consequences so prevalent in U.S. society.

This study is informed by several strands of research literature. This includes social mobility, higher education finance, college access, attainment, and return on investment, and social stratification.

Social Mobility

At the heart of an individual's decision to enroll in college is the desire for upward social mobility. Since at least the G.I. Bill of 1944 and later the Higher Education Act of 1965, higher education came to be perceived as the key essential for unlocking the door to a middle class lifestyle. The expansion of postsecondary education throughout the second half of the 20th century altered perceptions on the minimal requirements of obtaining a modest standard of living in the U.S. More importantly, the proliferation of both the structural as well as perceived importance of a college degree transformed the economic minimums of entry into the workforce of the late 20th and early 21st centuries.

There is little debate that higher education changed the landscape of U.S. society and it did so based on the promise of upward social mobility. Parents wanted a better material standard of living for their children or sought to maintain that standard of living through colleges and universities.

More significantly, higher education is perceived as the gateway to the American Dream. Haskins (2008) captures the common American attitude toward the purpose of higher education when he states: "The road to achieving the American Dream passes through the schoolhouse door" (p. 91). This sentiment reflects much of the higher education research on the economic mobility function of colleges and universities. In economic terms, this is viewed as one of several positive externalities of a college degree or credential.

The economic mobility function of higher education benefited most native-born Americans throughout the twentieth century. Isaacs (2008) notes that two out of three native-born Americans earned more than their parents did 30 years before. She also states that lower-income children will likely make more than their parents. Yet Sawhill (2008) tempers such optimism by suggesting that while Americans appear to be gaining somewhat in relative terms, family income growth has slowed and economic growth has not benefitted all. Family income remains one of the most significant determinants of a student's success in college and beyond (Haskins, 2008). Economic mobility is thus most predicated on a student's background.

Recent research by the Equality of Opportunity Project on upward social mobility has upended previous assumptions and conceptions of what sectors and specific

institutions of higher education prioritized mobility, particularly for lower-income students and students of color. Their observational statistics demonstrate disproportionately high rates of mobility in colleges not categorized as highly selective based on incoming student standardized test scores (Chetty, Friedman, Saez, Turner, & Yagan, 2017). The "engines of upward mobility" consist of a substantial number of MSIs (Chetty, Friedman, Saez, Turner, & Yagan, 2017). Intergenerational mobility is defined at the institutional level as the percentage of students coming from families in the bottom income quintile and advancing to the top quintile. The actual rate is calculated through multiplying the fraction of low-income students by the number of those students who reach the highest income quintile (Chetty, Friedman, Saez, Turner, & Yagan, 2017).

MSI Access, Attainment, and Return on Investment

State and federal lawmakers across the country have responded to the call of college completion (Complete College America, 2012; National Center for Public Policy and Higher Education, 2008; Obama, 2009). They have tasked the nation's colleges and universities with boosting the number of college graduates (Baum, Ma, & Payea, 2013; OECD, 2013). Fueling the college completion drive is the swiftly shifting demographics of the U.S. Those student populations traditionally underrepresented in higher education (students of color and low-income students) are precisely those essential to increasing degree attainment rates. It is worth recognizing that the participation, persistence, completion, and success of students of color are critical missions beyond fulfilling economic and workforce goals. All students regardless of class, color, and gender deserve the opportunity to enroll and graduate from higher education. Minority Serving

Institutions (MSIs) have provided this opportunity to students historically underserved by U.S. postsecondary institutions. While researchers have largely ignored connections between public policy and MSI outcomes, much of the extant higher education research on MSI completion and attainment provides needed context for assessing how these institutions serve students.

MSI Completion and Attainment

Gaps in completion based on racial and ethnic student populations have been well documented. A substantial portion of the extant research on college completion examines selective institutions (Bound, et al., 2010; Bowen et al., 2009; Kurlaender and Felts, 2008; Melguizo, 2010; Turner, 2004). Less focus has been placed on completion in nonselective four and two-year institutions. These are precisely those institutions that disproportionately enroll minority students. Recent work has begun to evaluate completion in MSIs (Flores & Park, 2013, 2014; Park, Flores, & Ryan, 2016; Nuñez, Richards and Awokoya, 2012; Strayhorn, 2008, 2016), though the bulk of such research tends towards qualitative and descriptive lenses. The research also tends to focus on specific MSI categories and not a combination of these types (Flores & Park, 2013, 2014; Park, Flores, & Ryan, 2016; Nuñez, Richards and Awokoya, 2012; Strayhorn, 2008, 2016). MSI completion research has increasingly emphasize the role of STEM education and completion (Crisp et al., 2009, Hurtado et al., 2011; Malcom and Dowd, 2012).

Given the exponential increase in MSIs and the number of students attending them, assessments of MSI completion are essential. The number of MSIs rose from 414 in the 1980s to approximately 1,200 by 2006. HSIs comprise 12.9% of non-profit

colleges and universities, yet enroll 21.9% of all students and 60.8% of all Hispanic students (Hispanic Association of Colleges & Universities, 2016). Researchers have documented some of the attainment gains of the various MSIs:

- Of the top 20 institutions that award science and engineering degrees to Asians or Pacific Islanders, seven identify as AANAPISIs (Gasman & Conrad, 2013).
- Ten HBCUs are among the top 20 institutions that award science and engineering degrees to Blacks (Gasman & Conrad, 2013).
- HBCUs enrolled 8 percent and graduated 18 percent of all Black students in U.S. higher education (2013) (NCES, n.d.).
- More than a third of black STEM PhD holders earned their undergraduate degrees at HBCUs (Upton & Tanenbaum, 2014).
- 10 HSIs are among the top 20 institutions that award science and engineering degrees to Hispanics/Latinos (Gasman & Conrad, 2013).

Additionally, Flores & Park (2014) employed advanced quantitative methods to determine if there was a difference in completion measures between students enrolled in four-year MSIs in Texas compared to students attending four-year non-MSIs in Texas. They specifically looked at six-year baccalaureate degree completion for Hispanic and Black students. They found that there was no statistically significant difference after controlling for institutional selectivity between graduation rates between MSIs and non-MSIs using propensity score matching.

Culturally Relevant Pedagogy

Prior research on the cultural significance of MSIs suggest that improved minority student outcomes can be partly explained by the degree in which MSIs embody an organizational identity that mirrors and privileges the values and backgrounds of their target population (e.g. HSIs and Latino/as) (Davis, 1991; Palmer & Gasman, 2008). Unlike many public four-year non-MSIs, MSIs develop programs that acknowledge cultural and community backgrounds of their students (Hubbard & Stage, 2009; Perna et al., 2009). Research has demonstrated the positive impact of students learning from and working with faculty and staff who share and understand students' backgrounds (Hirt, Strayhorn, Amelink, & Bennett, 2006). Important for college completion, MSIs provide information to assist students in navigating both college social mores and program requirements (Brown & Davis, 2001; Gasman, Baez, & Turner, 2000). Arguably the most significant role MSIs play in furthering student success is developing a nurturing environment and strong community (students, staff, faculty, and alumni) that is critical for the success of students within and beyond their time as an MSI student (Conrad & Gasman, 2015).

A rising concern in MSI research literature is determining if a federally designated MSI embraces its identity as an MSI. This research is beginning to connect the degree to which an institution works to serve its students of color or merely enrolls them (Malcom-Piqueux, 2013). Proponents of MSIs argue that such institutions more successfully educate and graduate students when it provides support programs aimed at its target student population (depending on what MSI classification it has received)

(Contreras & Contreras, 2014; Malcom-Piqueux, 2013). There continues to be much debate about how institutions can best and most fully advance themselves as an MSI. This is truer for AANAPISIs and HSIs as these institutions for the most part were not founded to serve students as an MSI (though the issues surrounding identity also play out in HBCUs and TCUs to a lesser extent) (Allen and Jewell, 2002; Marklein, 2014; US Department of Housing and Urban Development, 2014).

Research on MSIs reveals the impact of federally funded grant programs that target specific student of color populations. The majority of these studies are qualitative and explore the benefits to students of culturally driven pedagogies, support services, and course work (Conrad & Gasman, 2015; Gasman, Nguyen, & Conrad, 2015; Gasman, Baez, & Turner, 2008; Ladson-Billings, 1995; Morrison, Robbins, & Rose, 2008; Palmer & Gasman, 2008). Culturally relevant pedagogies emphasize the cultural empowerment of a student's background and community. By its nature, such an approach is infused with an adherence to social justice inequities (Garcia & Okhidoi, 2015; Ladson-Billings, 1995). They also have been shown to strengthen student learning and boost student outcomes (Gay, 2010; Ginsberg & Wlodkowski, 2009). Often these modes of learning include innovative approaches to instruction, such as flipped classrooms and incorporating the students' lived environments (Magolda & King, 2004; Teranishi, et al., 2016).

MSI Return on Investment

The dominant narrative of U.S. higher education public policy is the increase of college degree attainment. Policymakers and advocacy organizations call on institutions

to graduate more students to bolster the economic competitiveness of the U.S. in the future knowledge-based economy (Carnevale & Rose, 2015). Students and families, along with lawmakers and state leaders, demand evidence of a positive return on investment for taxpayer dollars invested in public higher education. While institutions must be held accountable for the quality of education and services they provide, it is imperative that various measures that affect institutions be evaluated closely to determine if they fulfill their purpose in a manner that does not negatively impact students.

Given their history serving a higher proportion of underprepared and under-resourced students, MSIs tend to show lower completion rates than other institutions. This is a cause for concern when external entities hold MSIs to the same standard as better-resourced institutions, particularly when state funding is tied to outcome measures (performance-based funding). This does not excuse MSIs from being responsible for the performance and quality of their education and service to their students. To satisfy policymaker as well as student and community expectations, MSIs must demonstrate their capacity to provide an education that leads to a credential or measurable outcome.

Though an increasing body of literature explores the relationship between institution attended and workforce earnings amongst minority graduates, almost no research has investigated how these factors play out in MSIs. Some researchers have assessed race and economic outcomes in flagship institutions (Andrews, Li, & Lovenheim, 2012, 2014; Hoekstra, 2009). Others have compared institutional selectivity to graduate workforce earnings (Brewer & Ehrenberg, 1996; Brewer et al., 1999; Dale & Krueger, 2002; Long, 2010; Zhang, 2005).

Research on the return on investment (ROI) of higher education has increased, particularly given policymaker and intermediary organization demands for such information. While research focusing exclusively on MSI ROI remains scant, it is growing. Much of this research is distinct from attainment or completion research in that the outcome variable of interest is workforce earnings instead of credential completion. Several recent studies commissioned by the Center for Minority Serving Institutions at the University of Pennsylvania explored the ROI of the more common MSI categories. These include assessments of AANAPISIs, HBCUs, HSIs, and TCUs.

In their paper assessing the impact of a federally funded learning community program at an AANAPISI community college, Teranishi, et al. (2016) demonstrate that the program substantially boosted degree attainment, increased transfer to four-year institutions, and lessened students' time to advance from developmental to college-level classes.

Park, Flores, & Ryan (2015) and Strayhorn (2015) tackle the topic of workforce ROI in MSIs. Park, Flores, & Ryan (2015) found that Latino graduates of HSIs have earnings comparable to Latinos from non-HSIs, after controlling for institutional selectivity. Meanwhile, Strayhorn (2015) demonstrated that HBCU graduates show positive returns on investment in occupational status and Black identity after controlling for institutional selectivity. This follows an earlier study wherein HBCU Black graduates were found to be at a slight disadvantage in workforce earnings when compared to Black graduates of non-HBCUs (Strayhorn, 2008). For the most part, these studies dispel the common criticism of MSIs as doing a disservice to their students by corralling them into

institutions suffering from low completion rates and ill-equipping them for the labor market (Harmon, 2012).

Such research demonstrates the potential for routine evaluations of federal grant-funded programs to reveal whether or not MSIs outperform non-MSIs in graduating students of color. Teranishi et al. (2016) provides a framework for conducting such rigorous assessment. Program evaluation offers MSIs a critical opportunity to rigorously document successful program characteristics. While program evaluations signal the strengths of MSIs to policymakers, they also measure the efficacy of MSI programs in supporting their students.

Higher Education Finance

The three primary components of higher education finance are state appropriations, tuition, and financial aid. Each affects institutions and students in different ways. Every state varies greatly in their approaches to finance policies, though many share similarities (especially neighboring or regional states). Much of the critical research on higher education finance discusses how the majority of the states fail to craft a coherent finance policy that coordinates each element into a harmonious union. This is further disrupted by the unwieldy suite of federal financial aid policies available to students, especially at MSIs.

Critics of public policy of higher education often aver that state higher education priorities rarely align finance policies with public priorities. These priorities, such as access, affordability, persistence and equity, are routinely compromised by contradictory and lopsided policies. This widespread disconnect is firmly rooted in the historical

development of higher education finance and the disparate development of public policy for postsecondary education throughout the states.

One line of critical state financial policy research believes that state policy prioritizes public colleges and universities over students. This can be seen in the primary funding mechanisms available to state governments: allocating funds, substantial involvement in tuition-setting, and dispersing financial aid. The majority of funding goes to institutions favoring higher enrollments (Hauptman, 2011). Further complicating funding concerns is the competing objectives of all involved parties. The lack of coordination among the funding mechanisms leads to counterproductive results (Hauptman, 2011; Jones, 2003).

The misalignment of priorities and policies stems in part from an ideological shift on the part of policymakers regarding the purpose of state support during the 1970s and 1980s. Students and families began shouldering more of the financial burden for higher education (Hauptman, 2011). Many economists, politicians and critics of higher education began to question the validity of the state using public funds to pay for what many policymakers myopically defined as private benefits. As the middle class served as a political pawn in state and federal higher education funding decisions, merit aid supplanted state need-based aid in popular usage in the southern states. From the Georgia HOPE Program in 1993 to the American Opportunity Tax Credit in 1992 at the federal level, funding policies at the state and federal levels reflected a long-running emphasis on affordability and enrolling traditional undergraduate students as opposed to equity and access (Zumeta, et al., 2012).

State Investment in Higher Education

States appropriating less funds to public higher education in the aggregate over time has been well documented (Doyle, 2007; McLendon, Hearn and Mokher, 2009; Tandberg, 2010). Public four-year institutions have responded to decreased state support by increasing tuition. Hence, students and families assume a larger share of the financial burden of earning a college degree at an ever-increasing rate (Paulsen and Smart, 2001). Between 1987 and 2012 tuition at a four-year public institution more than doubled, from an annual average of $2,588 to $5,189 (State Higher Education Executive Officers, 2012). Baum, Ma, & Payea (2013) reports that tuition has more than tripled between 1983-1984 and 2013-2014 in public four-year institutions and doubled in both public two-year and private nonprofit four-year institutions. Funding for Title III aid for institutional development programs, which support MSIs, declined from $651 million (2010) to $567 million (2013). Total revenue per FTE student is roughly $16,648 at four-year MSIs compared to $29,833 at non-MSIs (Cunningham, Park, & Engle, 2014).

Nuñez and Elizondo (2013) noted that HSIs on average received $3,446 per FTE compared to an average of $5,242 per FTE at other institutions (Hispanic Association of Colleges & Universities, 2012). They argue that funding inequity can contribute to lower graduation and retention rates. While an important addition to the research on MSI funding, this study did not disaggregate MSIs by sector (four and two-year or public and private) or selectivity. Other research has found that HSIs receive 69 cents for every dollar going to all other colleges and universities annually, per student, from all federal funding sources (Hispanic Association of Colleges & Universities, 2016).

Since their founding in the 19th century, public HBCUs have not received state financial support commensurate with their primarily white institution (PWI) peers. Many researchers have assessed the historic disparities in state appropriations to HBCUs (Boland & Gasman, 2014; Gasman, 2010; Minor, 2008; Perna et al., 2006; Sav, 2010). Funding disparities had been fought periodically throughout the late 19th and 20th centuries via landmark legal cases, including Plessy v. Ferguson (1896), Brown v. Board of Education (1954), and more recently with Knight v. State of Alabama (2006).

Recent studies demonstrated a continued disparity in state funding for public HBCUs. Sav (2010) found a 12.5 percent gap in state appropriations between public PWIs and public HBCUs. Both Minor (2008) and Boland and Gasman (2014) analyzed state funding in four of the states included in this study (Alabama, Louisiana, Mississippi, and North Carolina). Each state was shown to fund some or most of their public HBCUs at a lower per FTE rate than the state's public PWIs of comparable size. Brady, Eatman, and Parker (2000), employed a critical race theory lens to illuminate inequities in higher education finance that continue to prevail between HBCUs and PWIs.

It is important to acknowledge the ongoing funding disparity between public HBCUs and public PWIs when assessing the implementation and impact of performance-based funding on public HBCUs. These institutions are already chronically underfunded. Most have small endowments and charge low tuition. They rely on state appropriations to continue to provide programming to their students (Gasman, 2010; Minor, 2008). Since performance-based funding stipulates that institutions receive a portion of funding

depending on their success meeting specific metrics, institutions facing financial challenges such as HBCUs could be disproportionately penalized.

Tuition Setting

Two of the states in this study (Florida and Texas) allow institutions to determine tuition levels (though California public institutions enjoy varying degrees of autonomy, the four-year institutions determine tuition via compacts with the Governor. The legislature sets tuition in the community colleges). States vary in their approach to tuition-setting authority (McBain, 2010). Virginia also allows institutions to determine tuition. Washington State's legislature rescinded tuition-setting authority for institutions following dramatic tuition increased following the 2008 recession. The rationale for institutional tuition-setting authority is that in the face of deep state disinvestment in public higher education, institutions must have the ability to backfill lost appropriation revenue (Flores & Shepherd, 2014; McBain, 2010). The research on tuition deregulation tends to focus on four-year institutions, as these have been responsible for substantial tuition increases that have created obstacles to access by exacerbating affordability issues (Doyle 2009; Heller, 2013; Long and Kurlaender 2009). Prior research on the effect of tuition deregulation on minority and low-income students resulted in mixed results (Eisenkopf 2004; Frenette 2005).

A recent study by Flores and Shepherd (2014) reveals the detrimental impact of tuition deregulation on four-year public institutions on Hispanic students in Texas. Tuition spiked by 72% between fall 2003 and fall 2009 following tuition deregulation (Perna and Finney, 2014). Flores and Shepherd (2014) found that Hispanic enrollment

fell by 9.1%, despite an increase in the Hispanic high school graduation rate of 72% between 2002 and 2011.

Financial Aid

The finance policy shift in gradually transferring the burden of higher education costs from state government to students and families threaten stratification of U.S. higher education (Zumeta, et al., 2012). Financial aid has become essential to students and families, with some research demonstrating a link between financial aid and college completion (Baum, Ma, & Payea, 2013; Castleman & Long, 2016; Perna, 2010). Decreased financial assistance correlates to postsecondary attrition (Palmer, Davis, & Hilton, 2009). Effects of financial aid on enrollment and choice depend on aspects of the higher education context, including tuition, costs of attendance, and other types of financial aid (Heller, 2013; Perna & Kurban, 2013).

Pell Grants

The Pell Grant has enabled countless students to unlock the door to higher education. Its importance is emphasized by the fact that the previous two presidential administrations increased Pell Grant funding to $19 billion in 2014. Despite recent increases in Pell funding, many researchers note the fading purchasing power of the Pell Grant (Doyle, 2013; St. John, 2003). The increasing costs of attending college coupled with cratering state investment in higher education saps the purchasing power of the Pell Grant. Doyle (2013) asks whether the price of enrollment affects participation in higher education. Evidence for this paradox was revealed by the 2008. Enrollments rose as did

tuition rates. Doyle argues that few measures have been more successful at increasing access and completion than decreasing the price of attendance.

The purpose of the Pell Grant was to reduce financial barriers to college enrollment. It has become the primary need-based form of financial aid. The majority of college students receive some form of financial aid, with the Pell Grant comprising the largest portion of most student's financial aid packages. Many researchers argue that financial aid of all forms- federal, state, and institutional- should target students who cannot afford to participate in postsecondary education otherwise (Delaney, 2014; Doyle, 2013; Dynarski, 2000; Heller, 2003). Proponents of need-based financial aid contend that from an economist perspective, focusing on need-based aid is the most efficient use of scarce and dwindling state resources (Doyle, 2013). Such aid allows students without the financial means to enroll, unlike other middle and upper class students who would still enroll without financial aid. While support for the Pell Grant is widespread and somewhat non-partisan amongst state and federal lawmakers, empirical evidence of its contribution to access remains limited (Doyle, 2013; Hearn, 2001). This is due in large measure to the complexity in quantitatively evaluating the impact of the Pell on enrollment. Less research has demonstrated a causal relationship between Pell Grants and completion of a college credential.

State Financial Aid

A vast literature on state financial aid depicts the shift from need-based to non-need based (merit). By the late 1990s and early 2000s, many states began leaning more heavily on non-need based financial aid (Hearn, 2001). The Georgia HOPE (Helping

Outstanding Pupils Educationally) is often viewed as ground zero for merit aid. The Georgia HOPE Scholarship is part of a suite of grants and scholarships, all of which are entirely funded by the state's lottery system. Criteria include graduating from high school with at least a 3.0 GPA and maintaining this GPA in college. Another requirement is that recipients enroll in advanced courses in high school. 15 states adopted similar merit-aid policies inspired by Georgia's example, including Arkansas, Florida, Georgia, Kentucky, Louisiana, New Mexico, Nevada, South Carolina, South Dakota, Tennessee, and West Virginia. The percentage of students receiving federal financial aid in MSIs located in these states increased from 52% in 2000 to 71% in 2014. Institution aid increased from 25% to 33%. State financial aid increased by the lowest amount: 39% to 46%. The form of financial assistance that increased the most was student loans. 28% of students used loans in 2000, compared to 48% in 2014 (Boland, 2017).

While states continue to invest more into need-based aid, merit aid increased faster throughout the states up until the 2008 recession (Doyle, 2013). Doyle (2013) calculated that need-based aid increased by 43% between 2000 and 2011. During this same timeframe, merit-based aid increased by 350%. Merit aid for undergraduate students grew from $2.9 billion in 2005–2006 to $3.9 billion in 2010–2011 (Delaney, 2014). Delaney (2014) argues that the political popularity of non-need based aid ensures its prominence in public policy.

Loans

Student loan debt has far outpaced other popular modes of American debt (Hillman, 2014). Generally increasing higher education enrollment amidst increasing

tuition and fees can be explained in part by the availability of loans. Yet the weakening purchasing power of the Pell Grant and stagnant or slowly rising state and institutional financial aid means that students and families rely more heavily on loans to subsidize a college education. The Institute for Research on Higher Education (2016) argues that state policy strategy of prioritizing student loans as a viable finance mechanism places undue burden on low and middle-income students and families. Research demonstrates that a high proportion of low-income student loan borrowers fail to complete a credential (Doyle, 2013; Hillman, 2013). Much less research as revealed how varying levels of debt affect retention and completion. Low-income students also pay a much higher proportion of their family income to attend college. Combined with mostly stagnant family income over the past decade, low-income families (and middle-income) are unable to afford higher education, let alone other staple life expenses (Prescott & Longanecker, 2014; Toutkoushian & Paulsen, 2016).

The evolution of student loans reveals a primary weakness of finance policy overall, especially in regards to goals of attainment. One, it developed in an ad-hoc manner devoid of any form of central planning and led to deleterious unintended consequences. Two, both developed largely in response to middle and upper class interests. Three, student loans and finance policy in general consistently evolved via oftentimes opportunistic political maneuvering (Delaney, 2014; Doyle, 2013; Hillman, 2013; Prescott & Longanecker, 2014).

The Higher Education Act of 1965 demonstrated the tension between providing access to the lower class and maintaining affordability for the middle class. Lyndon

Johnson compromised with politicians to win some need-based financial aid by offering a concession in the form of private loans (Stafford loans). Availability of loans rose in the 1980s due to rising tuition and the growing private return of higher education by the end of the decade. Given the lack of policymaker interest in addressing student loans in the 1980s and early 1990s, concerned policymakers passed legislation on loans via budget acts. As loans continued to evolve – and state funding for higher education became more volatile (balance wheel by Doyle and Delany), more low-income students and families relied on them, contrary to their original political purpose of offsetting higher education expenses for middle and upper-income students and families.

College Affordability

In his critical assessments of state public policy approach to higher education finance, St. John (2003) refers to the "new inequality of opportunity." He- and many researchers- have empirically explored the problem of affordability and its impact on access. This research finds that the exponential increase in merit-based aid and federal tax credits has come at the expense of need-based aid. The financial aid imbalance benefits the middle and upper class while depriving lower-income students. This critical research holds public policy culpable for the increasing inequity in higher education finance and look to policy to challenge the pervasive stratification within higher education.

Financial aid plays an integral role in mitigating declining affordability. Lynch, Engle and Cruz as well as Hearn and St. John discuss the decreasing purchasing power of the Pell Grant, especially in the face of stagnating or declining family incomes and skyrocketing tuition (Hearn, 2001; Lynch, Engle and Cruz, 2011; St. John, 2003). This

occurred alongside policies begun during the late 1970s that favored increasing loans, merit-based and tax credits as the primary forms of financial aid (St. John, 2003). These shifts have led to a disparity in who shoulders much of the burden for financing higher education. Lynch, Engle and Cruz (2011) explain that in 275 colleges (many of which are MSIs), lower-income students pay over 100% of their family income.

St. John (2003) argues that the 1970s and 1980s policy about-face resulted in the growth in disparity. Callan (2011) calls policy the driver of financial aid expansion during the Great Society of the 1960s and through much of the 1970s. Yet the late 1970s and 1980s saw a shift towards a more conservative-minded policy focus on reining in taxpayer expenditures. St. John (2003) argues that equitable access was sacrificed on the altar of political gamesmanship, as policymakers jockeyed for key middle and upper class votes. He emphasizes the political nature of the policymaking process and how it is important to recognize this in working towards shaping policy decisions.

Social Stratification

Viewing MSIs through the lens of political frameworks and public policy research is essential in tracking the many connections between policy and performance in MSIs. Yet understanding the nuances of how MSIs exist within the context of U.S. higher education, educate their students, and graduate them into the workforce also requires a sociological conceptual approach.

The concept of social stratification allows a focus on how dominant, complex institutions contribute to our understanding of racial and class inequality in higher education and beyond (Grusky, 2014; Stevens, Armstrong, & Arum, 2008). According to

Grusky (2014), systems of stratification—such as colleges and universities—are made of up three core components: 1) institutional processes define and determine the desired good or outcome (e.g. transferring to a four-year degree program), 2) the rules that regulate how these goods are distributed across "various positions or occupations in the division of labor," and 3) "the mobility mechanisms that link individuals to occupations and thereby generate unequal control over valued resources" (p. 3). Despite the prevalent myth of higher education as a system of meritocracy and equal opportunity (Karabel, 2005), one need only look to the state of California and how its structure of higher education exemplifies the very ideals of social stratification. These assumptions lead me to consider and question if and how Minority Serving Institutions (MSIs) are more effective pathways for minority students in ways that offer them a meaningful advantage over their non-MSI peers, thereby representing an effort to reshape the current structure of higher education and to discourage the inequality that this structure is known to produce (Grodsky & Jackson, 2009).

Continuing with the example of California, the growth of the state's economy can be traced back to its investment in the Master Plan for Higher Education, which helped enroll and produce trained and qualified individuals to address the growing needs of the state's economy. But as California became more racially and economically diverse, the Plan was seen less as a source of equal opportunity and outcomes and more of a social sieve that regulated "access to privileged positions" by race and social class (Stevens, Armstrong & Arum, 2008). The University of California System sits on top of this structure, enrolling more students from middle- to upper-class backgrounds, thereby

conferring on students degrees that are more prestigious and well-received by the workforce or graduate and professional educational programs (e.g. medical and law schools), and reproducing—maintaining—or improving their class status in life (Geiser & Atkinson, 2012). This left a greater majority of students from less affluent backgrounds with access to less reputable campuses of the California State University and the California Community College Systems and, correspondingly, with opportunities that reproduced their social status or discouraged their ability to be upwardly mobile. The process of sorting students through this system strengthened the relationship between race and social class and degree attainment and workforce success, thereby exacerbating social inequality witnessed in the broader society. This tiered state system of higher education became a source of social stratification, linking "differential rewards and accidents of birth" (Grodsky & Jackson, 2009).

At the bottom of this stratified system are two-year institutions, which are characterized by significant challenges related to institutional and state bureaucracy, the task of educating nearly half of all students in postsecondary education, supporting a more diverse population of students who come from a wider degree of academic preparedness and enter with aspirations and goals that may deviate from the four-way path, and operating with fewer resources or less access to mechanisms for sustained funding. These challenges cultivate a campus environment that has overwhelmed students, discourage their academic performance and, ultimately, delay their time to completion (Bailey, Jaggars, & Jenkins, 2015; Rosenbaum & Deil-Amen, & Person, 2007)—this disproportionately affects racial minorities and students from poor and

working class backgrounds, student populations that dominate two-year institutions. With the rise of two-year MSIs in California, the question of their influence on minority achievement warrants attention from both scholarly and policy debates on the merit and effectiveness of higher education in this country.

Through the Higher Education Act of 1965, MSIs represented both a social and political response to the demand and need for equitable opportunity in higher education for historically marginalized populations (Gasman, Nguyen & Conrad, 2014). Under the Act, MSIs receive two significant benefits from the federal government to help them achieve this aim: 1) Legal recognition as a sector of American postsecondary education to be monitored and supported by the U.S. Department of Education, 2) Funds from the U.S. Department of Education to develop and promote promising practices and services intended to support institutions' target populations (e.g. HSIs and Latino/a students), as well as funds earmarked for MSIs from other federal agencies, such as the National Science Foundation.

In essence, MSIs represent a significant policy that demonstrates the recognition of inequality that continues to perniciously influence communities of color and a deepening, and long-term investment that is required to hinder its effects. At no point, however, has this federal policy ever been in conversation with state policies, such as those framed by the California Master Plan. This paper is an attempt to embed MSIs within the state context to establish a foundational understanding of how MSIs are changing the opportunity landscape.

Other research on the stratification in higher education provides examples of the outcomes of policy on increasing stratification. Davies & Zarifa (2012) explore how expansion and inequality happens at the individual and structural levels. Upper-class groups move through advanced levels of education and elite institutions through a process terms "maximally maintained inequality" (Raftery & Hout, 1993). This occurs as lower status groups have accessed higher education tiers. Such a cycle engenders further degree accumulation as both status signposts and a ticket to enter higher-paying occupations (Lucas, 2001). Many researchers have explored this process through the lenses of race, gender, and socioeconomic status in relation to education sector and field of study, as well as occupation and earnings (Davies & Guppy, 1997; Espenshade & Radford, 2009; Gerber & Cheung, 2008; Grodsky, 2007; Hearn, 1991; Karen, 2002; Mullen & Goyette, 2010; Mullen, Goyette, & Soares, 2003).

Stratification can occur at the institutional level when colleges and universities compete for scarce resources. By its nature, U.S. higher education is vastly unequal system. Community colleges- the sector educating the majority of college students- is its least resourced arm. Some researchers argue that policymakers strategically advance stratification by subjecting institutions to less state support and/or making a portion of appropriations contingent on institutions meeting performance metrics (Davies & Zarifa, 2012; Dougherty & Natow, 2015). The ultimate goal of such a strategy is weaning public higher education off of state support (Brint & Karabel, 1989; Davies & Zarifa, 2012; Dougherty, 1994). This would also result in a "Matthew effect," wherein increased

competition fosters greater disparities that would inhibit social mobility (Davies & Zarifa, 2012; Trow, 1984).

Studying stratification in higher education from a sociological vantage is helpful in illuminating stagnant completion rates amongst students of color. While Black and Hispanic students gained access in greater numbers since the 1970s, they still fail to complete in percentages similar to White and some Asian students (Posselt, Jacquette, Bielby, & Bastedo, 2012). Many researchers have explored the racial and class foundation to much of the inequity in completion throughout the tiers of U.S. higher education (Astin, 1985; Bowen, Chingos, & McPherson, 2009; Carnevale & Rose, 2003; Long & Kurlaender, 2009). Posselt, Jacquette, Bielby, & Bastedo (2012) found that selective institutions heightened admissions requirements, which in turn limited the enrollment of students of color.

Guiding Theoretical Perspectives

Research into college access and choice is often structured on the theoretical bulwark of economic and sociocultural approaches. According to human capital theory, students and their families assess the costs and benefits of enrolling in postsecondary education. They make informed decisions about what stands to be gained and at what price (in terms of fees, materials, and foregone earnings). At the core of this economic concept is the belief that an individual's investment in education increases her or his productivity and future earnings. Since students experience varying levels of academic preparation and academic performance, rational economic theory assumes disparities in college enrollment (Becker, 1993; Perna, 2006).

The human capital investment model cannot entirely explain gaps in college choice and access across sex, race/ethnicity, and socioeconomic status (SES) (Perna, 2006). Research reveals widely varying availability and interpretation of information regarding financing higher education and obtaining financial aid. Due to these differences, individuals' perceptions of the costs and benefits of higher education vary depending on access to information and non-economic factors including family, community, and high school contexts (Paulsen, 2001).

Sociocultural theoretical conceptions of college choice and enrollment illuminate the socioeconomic context wherein individual decision-making occurs. A sociocultural approach is predicated on status attainment models that frame a student's interest in pursuing higher education according to the student's social context, which includes family, teachers, guidance counselors, and friends (McDonough, 1997). This context directly contributes to an individual's decision to attend college, as well as her or his potential to complete a postsecondary education.

Intrinsic to sociocultural approaches to college access are notions of social and cultural capital. Sociological research tends to give primacy to Bourdieu's (1986) conception of social capital, which prioritizes the social value of an individual's affiliation with a particular social group. According to Bourdieu (1986), this social value affords access to networks offering varying levels of social currency (e.g., information). Bourdieu's view aligns with education-focused social capital theory in situating social networks within specific social relations and structures. The nature of social capital varies depending on where within the dominant societal power structure an individual resides

(Bourdieu, 1986; Lin, 2001). Bourdieu (1986) and McDonough (1997) emphasize the importance of habitus to a sociocultural approach. Recognizing a student's social context is essential in understanding her or his college-going decisions. Habitus refers to an individual's internalization of all notions derived from the environment and how these notions shape her or his actions.

CHAPTER 3: RESEARCH DESIGN

To date, there has been limited causal evidence demonstrating a link between Title III and V federal grants and college outcomes. This study incorporates a quasi-experimental research approach to estimate the relationship between federal MSI grants and institutional student outcome measures. The mechanism and criteria by which the federal government awards an MSI grant allows the opportunity to employ econometric methods to account for the possible self-selection bias that could weaken research on the effect of financial policy intervention (Becker, 2004; Dynarski, 2002; Heller, 2004). By treating the requirements of applying for an MSI grant as an experiment, I use a regression discontinuity design to make causal inference estimates of the impact of an MSI grant on institutional outcomes including college completion and upward social mobility (Imbens & Lemieux, 2008; Schneider, Carnoy, Kilpatrick, Schmidt, & Shalveson, 2007). The primary research questions of this study are:

1. Is there a relationship between Title V and Title III funding for MSIs and college completion?

2. Is there a relationship between Title V and Title III funding for MSIs and upward social mobility?

Analytic Sample and Data

For this empirical analysis, I constructed a unique institution-level panel dataset spanning 2000 - 2015 with 63,542 observations and consisting primarily of data culled from the U.S. Department of Education's National Center of Education Statistics IPEDS database, the Equality of Opportunity Project mobility datasets, the U.S. Department of

Education' Office of Postsecondary Education's Title V and Title III data relating to MSI grant funding, and the Penn Center for Minority Serving Institutions. Additional variables were collected from the National Association of State Student Grant & Aid Programs (NASSGAP), the U.S. Census Bureau, and the Bureau of Labor Statistics.

I focus on Alaska Native and Hawaiian Native Serving Institutions (ANNH), Asian American and Native American Pacific Islander Serving Institutions (AANAPISIs), Hispanic Serving Institutions (HSIs), Native American Serving Non-Tribal Institutions (NASNTIs), and Primarily Black Institutions (PBIs). I exclude Historically Black Colleges and Universities (HBCUs) and Tribal Colleges and Universities (TCUs), as these were founded specifically as MSIs and do not become eligible to receive Title III or Title V grant funding based on enrollment thresholds. I also exclude two-year not-for-profit private and less than two-year non-profit institutions, as there are very few MSIs within this sector (n = 13).

IPEDS

The U.S. Department of Education's National Center for Education Statistics (NCES) hosts Integrated Postsecondary Education Statistics (IPEDS), a comprehensive publicly available data source including more than 7,500 colleges and universities that participate in federal financial aid program. IPEDS is amongst the few datasets that provides enrollment, completion, and finance data. It is a system built on interrelated surveys conducted annually by NCES. IPEDS collects information from every college, university, and technical and vocational institution that participates in federal student financial aid programs. The Higher Education Act of 1965, as amended, requires that

institutions participating in federal student aid programs report data on enrollments, program completions, graduation rates, faculty and staff, finances, institutional prices, and student financial aid (NCES, n.d.).

Equality of Opportunity Project Mobility Report Cards

The Equality of Opportunity Project provides extensive publicly available data on intergenerational income mobility used in affiliated researchers' reports. Data for this study relates to Chetty et al. (2017), which uses several datasets including information for every U.S. postsecondary institution and more than 30 million college students between the years 1999-2013. The sample included in Chetty et al. (2017) comprises U.S. citizens with a Social Security Number or Individual Taxpayer Identification Number who were born between 1980-1991, and could be associated with their parents.

U.S. Department of Education Office of Postsecondary Education

The Higher Education Act of 1965, as amended (HEA; P.L. 89-329), authorizes the operation of numerous federal aid programs that provide support both to individuals pursuing a postsecondary education and to institutions of higher education. It also authorizes certain activities and functions. The most recent comprehensive reauthorization of the HEA was in 2008 under the Higher Education Opportunity Act (HEOA; P.L. 110-315). The U.S. Department of Education maintains data on MSI federal grant applications and awards dating back to FY 2009. It is currently the most comprehensive repository of MSI grant information per institution available. Additional restricted-use data on project abstracts and per institution award amounts came from an FOIA submitted to the U.S. Department of Education.

Penn Center for Minority Serving Institutions Database

This institution-level restricted use database consists of all institutions designated as MSIs (as of fall 2016). It is based on IPEDS data and divides institutions according to federal designation and grant award type. As it defines an institution according to receipt of a federal MSI grant, this dataset more strictly characterizes an institution as an MSI compared to other MSI advocacy organizations. Thus, the number of institutions categorized as MSIs in this study is likely lower than the number found in reports published by other organizations producing work focused on the different MSI types.

Dependent Variables

There are multiple dependent variables included within this study to obtain as accurate an analysis as possible of the impact of Title V and Title III funding on institutional college completion and upward mobility outcomes. Dependent variables are divided into two analyses: college completion and upward social mobility. The primary college completion dependent variables in this study are associate's degrees, two-year certificate and bachelor's degrees for the Title V and Title III MSIs. These dependent variables are disaggregated by race and ethnicity and gathered from IPEDS (retention, associate's and bachelor's degrees, and two-year certificates). Since IPEDS does not presently disaggregate institutions by MSI categories beyond HBCUs and TCUs, institutions were categorized according to the Penn Center for Minority Serving Institutions' MSI database. Each category of MSI is a dichotomous variable and all MSIs are also included as a dichotomous variable (1=MSI, 0=non-MSI). While IPEDS offers general completion variables, it does not currently provide these variables directly

through its available completion datasets disaggregated by race and ethnicity per each outcome variable. I created these variables, which include all races and ethnicities per outcome variable: all completion measures in the aggregate, bachelor's degrees in both public and private four-year institutions, associate's degrees, and two-year certificates. All completion dependent variables are continuous.

The dependent variables in the social mobility component of analysis are derived from the Equality of Opportunity Project. These variables are based on the five income quintiles included in research conducted by the Equality of Opportunity Project Social Mobility Report Cards. These include rising from the lowest income quintile to at least two quintiles higher, the lowest income quintile to the top 20 percent, and then varying levels of progression in between those levels (Chetty et al., 2017; Hillman, 2017). Chetty et al. (2017) explain that approximately 9 in 100 students achieve at least two levels of quintile progression and 1 in 100 students move from the lowest quintile to the highest. Chetty et al. (2017) determine the mobility rate through multiplying the percentage of students in the lowest income quintile (access rate) by the percentage of those who rise to the highest income quintile as adults (success rate). There are in total six variables for upward mobility (Hillman, 2017):

1. Bottom and to the highest (fifth quintile)
2. Bottom to the second to highest (fourth quintile)
3. Bottom to the third from the highest (third quintile)
4. One quintile from the bottom (second) to the highest (fifth)
5. One quintile from the bottom (second) to the second from highest (fourth)

6. Three quintiles from bottom to the highest (fifth)

7. Rising by any two quintiles

Independent Variables

Several factors have been shown to significantly affect student completion at the institution level. These include student characteristics (race/ethnicity, socioeconomic status as represented by the number of Pell recipients, and the proportion of enrollment that is students of color), institution characteristics (total enrollment, proportion of enrollment that is part-time, finance and revenue, tuition and fees, and instructional expenses), financial aid (Pell Grants, state need-based aid, and state merit-based aid), and state demographic and economic factors (percent of the population age 25 and older without a bachelor's degree, state unemployment level, and state per capita income) (Dynarski, 1999; Titus, 2009).

Student Characteristics

Based on the IPEDS variable of enrollment as per race/ethnicity, this includes American Indian or Alaska Native, Asian or Pacific Islander, Black non-Hispanic, Hispanic, Non-resident Alien, Two or More Races, White non-Hispanic, and Unknown. Prior research on higher education has used Pell Grant receipt as an imperfect proxy for SES. This study will follow suit and also incorporate other financial aid variables found in IPEDS (institution, state, and other federal financial aid, student loans). These will be treated as continuous variables for the analytic section of the study.

Institution Characteristics

Researchers have shown a relationship between institutional finance factors and college completion measures (Webber & Ehrenberg, 2009). These have been incorporated in this study and include state, local and federal appropriations, tuition and fees (as a source of revenue), total operating revenue, instructional expenses, academic support, federal operating grants and contracts, state operating grants and contracts, local operating grants and contracts. Also included are indicator variables for institutional selectivity. All institutional finance variables from IPEDS for analysis in this study were adjusted according to Jaquette & Parra's (2014) suggestions for correcting potential misuses of IPEDS data given parent-child relationships and mismatches between academic and fiscal years, depending on particular IPEDS surveys.

State Demographic and Economic Factors

As described in the review of the literature, state contextual factors have been shown to substantially affect institutions and outcomes. These demographic variables include the state's unemployment rate, the percent of the population above the age of 25 hold a baccalaureate degree, and the state per capita income. Titus (2009) has explored how these factors have had a demonstrable impact on bachelor's degree attainment. Similarly, studies exploring the effect of performance funding on baccalaureate degree production have noted some statistically significant effects on state-specific demographic variables (Dougherty and Reddy, 2013; Kelchen & Stedrak, 2016; Rutherford & Rabovsky, 2014; Tandberg & Hillman, 2014).

All continuous variables have been transformed to their natural logs in accordance with regression assumptions and to better interpret results. Wooldridge (2013) suggests using the natural logs of enrollment and finance variables that are larger integers and not proportions.

Estimation Strategy

Attempting to estimate the causal effect of the MSI grant on outcomes is complicated by many factors. A linear OLS regression model fails to control for several sets of potentially intervening variables. One possibility is that the desire of an institution to apply for federal funding could result in some form of manipulating enrollment to result in the institution achieving the student racial and income threshold to be eligible for the Title III or Title V grants. Also, many institutions eligible to apply for an MSI grant are unaware of such eligibility (most often with eligible AANAPISIs). In these instances, the treatment would not be strictly exogenous and would thus violate regression assumptions and lead to biases results. Other unobserved factors could also be endogenous and create biased coefficients (Becker, 2004; Cellini, 2008; Dynarski, 2003; Heller, 2004).

By using a regression discontinuity research design, a researcher can make causal estimates of the impact of policy interventions by accounting for unobserved individual heterogeneity that could be correlated with the MSI grant (Angrist & Pischke, 2009; Cellini, 2008; Schneider et al., 2007; Thistlethwaite & Campbell, 1960). This approach divides subjects into treatment and control groups depending on a factor that is exogenous to the subject. If a subject could manipulate some form of action to enter the

treatment, this could bias the results of the study. Regression discontinuity mimics an experiment at the cutoff value of a particular variable (the forcing or running variable) (Lee & Card, 2008). This quasi-experimental approach allows the researcher to obtain a causal estimate of a programmatic effect (as measured by outcome variables) without the random assignment of the treatment to a particular group as found in randomized control trials (Shadish, Cook, & Campbell, 2002). Higher education researchers routinely employ regression discontinuity design to estimate the causal effects of various higher education interventions, including the measurement of college completion (Bettinger, 2004; van der Klaauw, 2002).

A robust regression discontinuity study requires the careful selection of a forcing variable (Imbens & Lemieux, 2008). The regression discontinuity design exploits a discontinuity in the probability of treatment due to a small change in the forcing variable for institutions just above and below the treatment cutoff point. MSIs receive federal funding (treatment), compared to institutions that do not (comparison). Treatment is assigned based on a forcing variable (enrollment represented as a continuous variable) with a specific cutoff (a percentage a particular racial or ethnic enrollment category). As an institution is primarily designated as an MSI according to the enrollment of a specific racial group, my forcing variable will be enrollment based on race and ethnicity.

Estimation Procedures

Most studies using regression discontinuity rely on multiple specifications to fortify the robustness of the findings. The two estimation approaches in regression discontinuity are nonparametric and parametric (usually polynomial regression). The

most common non-parametric regression discontinuity method is a local linear regression. This approach narrowly focuses on subjects near the cutoff. It utilizes Wald estimators or local-polynomial regression).

Parametric approaches tend to take the form of sharp or fuzzy regression discontinuity designs. In an application of sharp regression discontinuity in this study, the impact of the MSI grant would be estimated by regressing the MSI grant award on the assignment variable (enrollment by specific racial category) and on an indicator depending on the discontinuity in the MSI grant rule (Angrist & Pischke, 2009; van der Klaauw, 2002). The indicator variable coefficients could be interpreted as a causal estimate of the impact of the MSI grant. The theoretical justification for a sharp design would be every institution automatically receiving an MSI grant upon reaching a specific enrollment threshold of students of color and low-income students.

The statistical representation of sharp regression discontinuity is:

$$Y_i = \alpha + \beta MSIGrant_i + \gamma' + f(Forcing_i) + \theta X_i + \varepsilon$$

Yi represents the outcome variable. $MSIGrant_i$ is an indicator for whether the subject received treatment. $fForcing_i$ is a flexible form of the forcing variable, which could be linear, quadratic, cubic, etc. The relationship between $Forcing_i$ and Y_i can be different before and after cutoff. X_i is a set of control variables. ε is a random error term. β can be interpreted as the causal effect of treatment on the outcome for subjects who are near the cutoff value.

In an instance when the assignment rule is correlated with the treatment without completely explaining the treatment, a fuzzy regression discontinuity design can be

deployed (Lesik, 2006; van der Klaauw, 2002). The MSI federal grant can be considered a natural application of fuzzy regression discontinuity, since the determination of which institutions receives the grant depends on an assignment rule intrinsic to an institution's enrollment. Yet becoming eligible for the grant is not completely explained by the rule. Additionally, not every institution eligible for the MSI grant applies for it. This is another common reason to rely on fuzzy regression discontinuity. When implementing a fuzzy regression discontinuity design, a two-stage process estimates the causal impact of a treatment that is similar to instrumental variables strategy (Angrist & Pischke, 2009; van der Klaauw, 2002). The initial stage involves the predicted treatment level being estimated via regression of the actual treatment on the assignment rule variable and on indicator variables depending on the decision rule to account for the discontinuity. In the second stage, the causal impact of the treatment is identified as the "coefficient on the predicted treatment variable derived in the first stage is regressed upon the outcome variable controlling for the assignment rule.

The first stage is represented as:

$$Treatment_i = \alpha + \beta Eligible_i + \gamma' \quad + \quad f(Forcing_i) + \theta' \quad X_i + \varepsilon$$

$Treatment_i$ is an indicator for whether the subject received treatment. $Eligible_i$ is an indicator of whether they were deemed eligible for treatment based upon forcing variable. This is a variable that indicates if they should have received treatment.

The second stage can be represented as:

$$Y_i = \alpha + \beta \ MSIgrant_i + \gamma' \quad + \quad f(Forcing_i) + \theta' \quad X_i + \varepsilon$$

$MSIgrant_i$ is the predicted likelihood of treatment estimates from the first stage. β is the impact of treatment on the treated. This is the effect of the treatment for those who received the treatment.

To identify the treatment effect of an institution being entitled to the MSI federal grant, I take advantage of the fact that grant eligibility depends on an enrollment threshold. As enrollments across institutions are theoretically exogenous and assuming that institutions are not manipulating enrollment, I focus on MSIs within the vicinity of the eligibility threshold. I assume that the institutions just below the enrollment threshold (emerging MSIs) demonstrate many similarities to those MSIs just above the threshold. Receipt of the MSI federal grant can be considered as a random assignment. Given the assumption that without the treatment, the outcome is a function of the MSI grant, the causal effect of receiving the grant is identified through a comparison between the average outcomes of institutions just above (MSIs) with those just below (emerging MSIs) in a fuzzy regression discontinuity research approach.

The primary benefit of employing non-parametric methods is that they offer estimates based on the data near the cut-off. Local linear regressions are optimal because they have better bias properties and have better convergence. In other words, this can reduce bias that results from using data farther from the cutoff to estimate the discontinuity at the cutoff. Using both estimation approaches strengthens the results of the study as it can be argued that the results do not rely on the particular approach used (Lee & Lemieux, 2010).

In parametric approaches, the relationship between the forcing variable and the dependent variable is modeled with a functional form, such as linear, cubic, or quadratic. An advantage of this approach is that it uses all data, thus increasing the power of the analysis. Yet it relies on assumptions regarding the functional forms. The primary assumption in the parametric regression discontinuity strategy is that the functional form between the forcing variable and the outcome is identified and the average outcome for those just below the cutoff serves as a counterfactual for those just above the cutoff (Lee and Lemieux, 2010). It should be emphasized that this assumption does not suggest that every institution from the sample above and below the cutoff point share similarities on all unobserved factors, but only that these subjects become similar on these factors in the limit as the forcing variable nears the cutoff threshold (Murname & Willett, 2011).

Analysis

To answer its research questions, this study includes three primary analyses using parametric fuzzy regression discontinuity design:

1. Title V and college completion
2. Title V and upward mobility
3. Title III and college completion

For an institution to be eligible to receive Title V funding as an HSI, it must be comprised of a full-time enrollment that is at minimum 25 percent Latino/a. Thus, the forcing variable in relation to Title V for college completion outcomes as well as upward mobility is the proportion of Latino/a enrollment. Title V was passed into law in 1998. Institutions began receiving funding via Title V in the 1999-2000 academic year. The

timeframe for Title V analyses is 2000 to 2006 based on the average number of years for students to obtain a bachelor's degree.

Chetty et al. (2017) describe their definition of upward mobility as the comparison between parent's income and children's income at ages 32-34. The Equality of Opportunity Project data is oriented according to cohorts based on student birth years. They calculate data values as an average of the 1980, 1981, and 1982 birth cohorts. This corresponds to 2010, 2011, and 2012 in this study's dataset, allowing approximately ten years after those in these birth cohorts completed their college credentials. Mobility outcome measures in this study are derived from the mean values of these years matched to the Equality of Opportunity Project birth cohort years. Thus, I focus on an average of the 2000, 2001, and 2002 years to evaluate upward mobility in HSIs according to the implementation of Title V.

Mobility outcome measures are based on those calculated by Hillman (2017). Each variable is a product of the fraction of parents in an income quintile and the probability of their children within a quintile contingent on their parent's income quintile:

1. Bottom and to the highest (1^{st} to 5^{th})
2. Bottom to the second to highest (1^{st} to 4^{th})
3. Bottom to the third from the highest (1^{st} to 3^{rd})
4. One quintile from the bottom to the highest (2^{nd} to 5^{th})
5. One quintile from the bottom to the second from highest (2^{nd} to 4^{th})
6. Three quintiles from bottom to the highest (3^{rd} to 5^{th})
7. Increasing any two quintiles

Several categories of MSIs receive funding via Title III. As the focus of this study is on the impact of Title III for all MSIs that receive funding via Title III on college outcomes, this analysis requires a multiple-cutoff regression discontinuity design based on the incorporation of multiple enrollment thresholds. This form of regression discontinuity incorporates more than one forcing variable. As Title III provides funding for several categories of MSIs, using a multiple-cutoff regression discontinuity approach is preferred. This allows for an analysis of AANAPISIs (10 percent enrollment of Asian American and Pacific Islander students), ANNHs (20 percent Alaska Native and Hawaiian Native students), NASNTIs (20 percent American Indian students), and PBIs (40 percent Black students). Researchers have accounted for the heterogeneity in the value of multiple cutoffs through normalizing the score so that the cutoff becomes zero for all units. Through this "normalizing-and-pooling approach," inferences can then be made as in the case of a standard regression discontinuity design (Cattaneo, Keele, Titiunik, & Vazquez-Bare, 2016).

Institutions began receiving funding via Title III as MSIs in the 2008-2009 academic year. The timeframe for the analysis of college completion measures for Title III is 2009 – 2015. Data from the Equality of Opportunity Project Mobility Report Cards do not cover years after 2013. They also measure mobility ten years after a student completes their college credential. Thus, this study cannot conduct a proper investigation of the impact of Title III MSI grants on upward mobility given limitations in available data and the minimal number of treatment and post-treatment years since the advent of Title III grants for MSIs.

Sensitivity Analysis

There are several techniques utilized by researchers to test the validity of regression discontinuity designs. A common approach is to test the robustness of estimates across different functional forms of the assignment variables in the first and second stages of a two-stage least squares procedure. This usually takes the form of including an alternative polynomial function, such as linear, cubic, quartic, or quadratic. A researcher will often report the results of one form (Lee & Lemieux, 2010). The results of these tests are presented in the appendix.

Other methods can be implemented to test the validity of the research design. McCrary (2008) introduced the density test, which relates to an examination of the density of observations of the assignment variable. The appearance of a discontinuity in the density of the assignment variable near the cutoff point for treatment indicates that some subjects manipulated their treatment status. In the case of this study, this would be represented by institutions gaming their enrollment totals to gain eligibility to apply for the MSI federal grant. I performed the McCrary test and found no evidence of institutions manipulating their enrollment to be eligible for federal MSI funding.

Another validity test similar to closely assessing the means of variables in both groups near the cutoff, the continuity of observable control variables should not change significantly in the treatment group. In other words, we expect that since the variables were determined before treatment (receiving the MSI federal grant), these variables (excluding the dependent variables) should not change after the introduction of the treatment (receipt of the grant).

A final validity check common to other quasi-experimental research strategies is adding or removing covariates to determine the impact on results. If parameter estimates prove sensitive to the inclusion or exclusion of control variables, this calls the design's validity into question. If a substantial volume of bias is present that is explained by covariates, this then significantly affects the parameter estimates. These models are included in the appendix and did not demonstrate a detectable impact throughout the different dependent variable estimations.

Limitations

Despite precautions taken to control for potential bias in the awarding of the federal MSI grant, it is more accurate to claim that findings from the study are plausibly causal in nature regarding the relationship between the grant and outcomes. Results from the regression discontinuity design could be affected by unobserved factors not controlled for in the study. Efforts have been taken to minimize the impact of such unobserved characteristics as described in the validity section above. It is possible that another federal financial, state, or institution financial intervention could have an effect on student outcomes. Another concern is the potential for manipulation bias. Robustness checks in the research design should guard against manipulation bias, but there remains the possibility it would not account for any possibility of an institution adjusting enrollment numbers (through different means) in order to be eligible for an MSI grant.

Another limitation of the study is its generalizability to non-MSIs and MSIs not included in the study in other categories or other states. The MSI federal grant is unique when compared to other federal financial intervention in higher education in that

institutions are eligible based on the enrollment of a specific student population. Thus, HBCUs and TCUs are not included in this study due to the fact that these institutions were established specifically to serve students of color and not due to a change in the enrollment of such students.

Lastly, this study relies entirely on its data sources for the reliability of the measurement and reporting of that data. Measurement error is possible in some instances, though unlikely on a large scale given the general dependability of the data sources used in this study. As noted above, the IPEDS survey relating to enrollment figures is one area that could bias the results of the study if an institution manipulated the reporting of such data as part of a strategy to gain eligibility for an MSI grant. There are more limitations associated with the Equality of Opportunity Project data that limit the scope of this study. First, data used in this study are not currently disaggregated by race and ethnicity, as this dataset focuses on institutional outcomes as measured by upward mobility. While outcome variables for the completion analysis do feature this information separately, the upward mobility analysis does not include this more granular empirical approach. Second, as noted above, parent-child relationships in IPEDS data are a concern for all researchers using IPEDS data in empirical analysis. Nearly 600 institutions are included with other institutions, such as larger state systems. It is possible that in such cases, a specific school could have more of an impact on results. Also, more than half of the institutions in this dataset are missing varying amount of information. Approximately 70 percent of institutions in the Equality of Opportunity Project data could be matched to the IPEDS information included in this study. Third, this dataset does not account for

students transferring to one or more institutions throughout their undergraduate careers. This is an important consideration, as roughly 40 percent of freshmen students transfer to another institution within six years of enrolling in the first institution (Shapiro, Dundar, Huie, Wakhungu, Yuan, Nathan, & Hwang, 2017). While the exact process on how the researchers chose the primary institution for transfer students is opaque, the dataset includes transfer students based on the institution they enrolled in for the longest amount of time and the institution enrolled in at age 20.

CHAPTER 4: RESULTS

Descriptive Statistics

Table 5 displays the descriptive statistics for the dependent variables included in the Title V phase of analysis. There are a total of 734 public four-year institutions, 1,717 private four-year institutions, and 1,027 community colleges in the sample. Each category of MSI per sector is show in table 4. Private four-year schools comprised the largest number of institutions (1,648) and public four-year the least (667). As seen in table 5, the public four-year institutions awarded on average nearly 1,400 bachelor's degrees between 2000 and 2006. Private four-year colleges and universities awarded near 300 bachelor's degrees during the same timeframe. Community colleges awarded approximately 100 associate's degrees and certificates on average between 2000 and 2006. Table 5 also includes the average for all college credentials disaggregated by race and ethnicity.

Table 4:

MSI categories by sector

	Four year public	Four year private	Two year public	Total
AANAPISI	30	23	69	122
AANH	5	0	5	10
HSI	52	68	135	255
NASNTI	6	1	9	16
PBI	8	18	69	95
Total	101	110	287	498

Table 5:

Average of dependent variables included in Title V analysis, 2000-2006

	Mean	SD	Minimum	Maximum	Observations
Total BA, public four year	1399.536	1593.978	0	9840	4,508
Total BA, private four year	287.0092	470.1849	0	7497	11,448
Latino/a BA, public four year	104.0047	252.9412	0	3092	4,508
Latino/a BA, private four year	19.5642	66.3286	0	1322	11,448
Asian American & Pacific Islander BA, public four year	94.07614	273.1066	0	3110	4,508
Asian American & Pacific Islander BA, private four year	14.57737	54.52462	0	1110	11,448
White BA, public four year	984.8841	1188.552	0	8386	4,508
White BA, private four year	200.0156	331.619	0	6797	11,448
Black BA, public four year	115.341	169.1967	0	1523	4,508
Black BA, private four year	24.23334	62.92764	0	1202	11,448
American Indian & Alaska Native BA, public four year	10.94859	25.7543	0	367	4,508
American Indian & Alaska Native BA, private four year	1.325964	3.7193	0	201	11,448
Non-resident alien BA, public four year	38.346	67.0276	0	523	4,508
Non-resident alien BA, private four year	11.2266	31.03905	0	414	11,448
Total AS	97.49073	292.7666	0	16676	9,350
Latino/a AS	10.1835	60.2068	0	4073	9,350
White AS	64.60193	201.6112	0	11944	9,350
Asian American & Pacific Islander AS	4.622659	24.925	0	644	9,350
American Indian & Alaska Native AS	1.443	9.0336	0	578	9,350
Black AS	10.81251	47.8799	0	2891	9,350
Non-resident alien AS	1.909	12.7526	0	742	9,350
Total Certificates	95.04131	256.514	0	13773	9,350
Latino/a Certificates	16.3844	96.1406	0	6399	9,350
White Certificates	50.5764	148.7455	0	6867	9,350
Asian American & Pacific Islander Certificates	4.2815	24.6095	0	1939	9,350
American Indian & Alaska Native Certificates	1.0648	6.8945	0	394	9,350
Black Certificates	15.9908	53.2757	0	1606	9,350
Non-resident alien Certificates	0.9006	9.7616	0	695	9,350

Table 6 includes descriptive statistics for the independent variables in the Title V analysis for public four-year institutions, Table 7 includes independent variable statistics for private four-year institutions, and those statistics for community colleges are presented in Table 8. Each category- institutional finance, enrollment, financial aid, institutional characteristics, and state characteristics- corresponds to each postsecondary

sector. As described earlier, variable selection was informed by this study's conceptual approach. Theoretically, these characteristics are believed to directly have an impact on degree or credential completion as well as upward social mobility.

Table 6:

Average of control variables included in Title V analysis, public four-year institutions, 2000-2006

	Mean	SD	Minimum	Maximum	Observations
Academic Support*	11862.28	23892.5	0	273961.8	3,808
Instruction*	62596.2	87157.8	0	869486	3,822
Federal Operating Grants*	31858.95	69566.51	0	69566.51	3,822
Federal Grants Other*	1115.805	3403.586	0	84697.3	3,822
Total Operating Revenues*	190614.7	341412	0	3671590	3,822
Local Appropriations*	361.6698	3060.543	0	61266.49	3,822
State Appropriations*	64594.54	64594.54	0	642514	3,822
Federal Appropriations*	3081.503	29683.97	0	525575.9	3,822
State Operating Grants*	6668.906	12225.03	0	134953	3,822
Tuition & Fees*	42152.65	58948.95	0	58948.95	3,822
Pell Grants*	5615.662	5574.218	0	90388.86	3,822
State Need-Based Aid*	170253.9	227798.8	0	886020.1	5130
State Merit-Based Aid*	36809.21	83557.63	0	479420	5130
Total full-time, first time enrollment	8257.799	7595.425	0	7595.425	3,822
In-state Tuition and Fees	3852.262	1946.665	0	21487	3,822
Out-of-state Tuition and Fees	9644.424	4151.338	0	29064	3,822
State per Capita Income	32363.01	5621.351	20563	57025	5,130
State unemployment rate	5.1045	1.0273	2.3	8.1416	5,130
Percent of state age 25 or older with bachelor's degree	25.6018	4.4578	16.5	37	5,130

** per $1,000*

Table 7:

Average of control variables included in Title V analysis, private four-year institutions, 2000-2006

	Mean	SD	Minimum	Maximum	Observations
State Grants*	825.1343	1656.413	0	25017.52	12,354
Federal Grants Other*	581.5148	1827.919	-680.891	35413.8	12,354
Federal Operating Grants*	926.4423	2923.111	0	84626.26	12,354
Academic Support*	410.3677	3361.5	0	299425	12,363
Instruction*	20162.66	67508.51	0	1152617	12,363
Total Operating Revenues*	74268.47	306764.2	0	7488944	12,354
Local Appropriations*	9.222	58.221	0	1684.254	12,354
State Appropriations*	196.663	1502.225	0	39118	12,354
Federal Appropriations*	192.6031	4926.11	0	181636.9	12,354
Tuition & Fees*	22908.1	49436.7	0	973761	12,354
Pell Grants*	1035.387	2283.753	0	70162.16	12,354
State Need-Based Aid*	221651.5	252310.4	0	886020.1	12,354
State Merit-Based Aid*	34789.68	76088.87	0	479420	12,354
Total full-time, first time enrollment	1720.183	2273.994	0	30798	12,354
In-state Tuition and Fees	11634.36	7839.178	0	34042	12,354
Out-of-state Tuition and Fees	11639.32	8050.806	0	34042	12,354
State per Capita Income	33222.35	5350.976	20563	57025	14,170
State unemployment rate	5.1045	1.0273	2.3	8.1416	14,170
Percent of state age 25 or older with bachelor's degree	25.6018	4.4578	16.5	37	14,170

** per $1,000*

Table 8:

Average of control variables included in Title V analysis, public two-year institutions, 2000-2006

	Mean	SD	Minimum	Maximum	Observations
Academic Support*	1639.192	2655.512	0	33375.91	6,858
Instruction*	12372.83	13217.28	0	13217.28	6,858
Federal Operating Grants*	4147.15	4147.15	0	742705.8	6,858
Federal Grants Other*	328.3694	2913.779	0	180000	6,858
Total Operating Revenues*	23192.72	65346.52	0	2957668	6,858
Local Appropriations*	5404.669	10934.88	0	126528.3	6,858
State Appropriations*	10562.25	12990.53	0	461000	6,858
Federal Appropriations*	160.8167	1725.014	0	1725.014	6,858
State Operating Grants*	1631.661	2806.125	0	46861.71	6,858
Tuition & Fees*	5789.115	7210.234	0	120500	6,858
Pell Grants*	2880.849	3400.988	0	50797.23	6,858
State Need-Based Aid*	158467.9	214019.1	0	886020.1	6,858
State Merit-Based Aid*	50685.48	97550.96	0	479420	6,858
Total full-time, first time enrollment	5122.825	7010.148	0	378162	6,858
In-state Tuition and Fees	1983.895	1322.158	0	12855	6,858
Out-of-state Tuition and Fees	4589.054	4589.054	0	18782	6,858
State per Capita Income	31687.84	5218.525	20563	54191	6,858
State unemployment rate	5.1045	1.0273	2.3	8.1416	6,858
Percent of state age 25 or older with bachelor's degree	25.6018	4.4578	16.5	37	6,858

** per $1,000*

Average statistics for the dependent variables in the Title III analysis are featured in Table 9. Between 2007 and 2015, public four-year institutions awarded over 1,600 bachelor's degrees on average. Private four-year institutions awarded an average of 624 bachelor's degrees. Community colleges awarded roughly 130 associate's degrees and 126 certificates. As displayed in Table 9, each credential is separated by race and ethnicity. Average statistics for control variables per sector are shown in tables 10, 11, and 12.

Table 9:

Average of dependent variables included in Title III analysis, 2007-2015

	Mean	SD	Minimum	Maximum	Observations
Total BA, public four year	1659.52	1991.626	0	13230	5,599
Total BA, private four year	642.1422	1217.52	0	18231	13,251
Latino/a BA, public four year	168.5353	390.6823	0	6163	5,599
Latino/a BA, private four year	30.0575	86.5785	0	1482	13,251
Asian American & Pacific Islander BA, public four year	122.3815	343.2835	0	3477	5,599
Asian American & Pacific Islander BA, private four year	19.1218	68.4291	0	1476	13,251
White BA, public four year	1074.353	1351.918	0	9249	5,599
White BA, private four year	224.7583	380.2689	0	6296	13,251
Black BA, public four year	141.9911	207.5115	0	1736	5,599
Black BA, private four year	29.8412	69.4286	0	1255	13,251
American Indian & Alaska Native BA, public four year	11.0973	26.6806	0	370	5,599
American Indian & Alaska Native BA, private four year	1.5592	3.6587	0	54	13,251
Non-resident alien BA, public four year	51.7769	114.5614	0	1535	5,599
Non-resident alien BA, private four year	14.1362	41.6176	0	827	13,251
Total AS	128.6886	522.0921	0	39341	8,573
Latino/a AS	18.4005	116.304	0	7958	8,573
White AS	75.03105	290.045	0	19086	8,573
Asian American & Pacific Islander AS	6.092	33.7789	0	1282	8,573
American Indian & Alaska Native AS	2.0444	12.4734	0	702	8,573
Black AS	16.0743	84.692	0	6031	8,573
Non-resident alien AS	2.2519	18.3016	0	974	8,573
Total Certificates	126.0025	316.4689	0	10447	8,573
Latino/a Certificates	25.0564	133.9818	0	10155	8,573
White Certificates	62.2892	171.8449	0	8150	8,573
Asian American & Pacific Islander Certificates	5.2361	27.04356	0	1858	8,573
American Indian & Alaska Native Certificates	1.3229	7.0084	0	475	8,573
Black Certificates	22.5809	75.4047	0	2136	8,573
Non-resident alien Certificates	1.0587	12.5177	0	1186	8,573

Table 10:

Average of control variables included in Title III analysis, public four-year institutions, 2007-2015

	Mean	SD	Minimum	Maximum	Observations
Academic Support*	26058.79	48072.53	0	619181.6	5,666
Instruction*	102990.1	149861.2	0	1891603	5,492
Federal Operating Grants*	30444.06	75676.16	0	1092973	5,492
Federal Grants Other*	1806.63	4926.183	0	74432.63	5,492
Total Operating Revenues*	234738.6	510455.7	118.911	5742412	5,492
Local Appropriations*	697.574	5850.957	0	124164	5,492
State Appropriations*	72760.89	95144.71	0	684235	5,492
Federal Appropriations*	2667.017	31274.81	0	598426.4	5,492
State Operating Grants*	7752.695	15792.13	0	152928	5,492
Tuition & Fees*	75740.68	113063.4	0	1021014	5,492
Pell Grants*	13615.86	14128.95	0	174629.9	5,492
State Need-Based Aid*	282241.3	386260	0	1902162	5,525
State Merit-Based Aid*	69977.12	145931.1	0	766979.9	5,525
Total full-time, first time enrollment	9527.82	8950.083	1	66701	5,492
In-state Tuition and Fees	6575.927	6575.927	0	17945	5,639
Out-of-state Tuition and Fees	15128.24	6817.369	0	43377	5,639
State per Capita Income	42961.26	7101.558	29801	74094	5,525
State unemployment rate	7.0381	2.0658	2.6833	12.1417	5,525
Percent of state age 25 or older with bachelor's degree	27.4695	4.8724	16.5	41.2	5,525

** per $1,000*

Table 11:

Average of control variables included in Title III analysis, private four-year institutions, 2007-2015

	Mean	SD	Minimum	Maximum	Observations
State Grants*	1014.885	1848	0	26355.52	12,764
Federal Operating Grants*	4846.493	24690.77	0	463666.9	12,764
Federal Grants Other*	694.9329	2807.003	0	81628.21	12,764
Academic Support*	410.3677	3361.5	0	299425	12,764
Instruction*	32264.87	120209.9	0	2310502	12,764
Total Operating Revenues*	108460	473347.9	0	9150248	12,764
Local Appropriations*	3.199	53.305	0	1448.776	12,764
State Appropriations*	194.7935	1498.695	0	36627	12,764
Federal Appropriations*	176.1306	4756.923	0	163794.3	12,764
Tuition & Fees*	38379.61	84433.6	0	1599844	12,764
Pell Grants*	2312.405	2312.405	0	110724.2	12,764
State Need-Based Aid*	370532.7	455240.5	0	1902162	13,005
State Merit-Based Aid*	53644.41	119420.9	0	766979.9	13,005
Total full-time, first time enrollment	1984.701	2943.305	1	49744	11,108
In-state Tuition and Fees	18207.38	12625.81	0	55748	13,135
Out-of-state Tuition and Fees	18216.49	12618.91	0	55748	13,135
State per Capita Income	44414.66	7329.139	29801	74094	13,005
State unemployment rate	7.0381	2.0658	2.6833	12.1417	13,005
Percent of state age 25 or older with bachelor's degree	27.4695	4.8724	16.5	41.2	13,005

** per $1,000*

Table 12:

Average of control variables included in Title III analysis, public two-year institutions, 2007-2015

	Mean	SD	Minimum	Maximum	Observations
Academic Support*	3921.779	5425.14	0	82769.84	8,646
Instruction*	20833.95	22532.9	157.529	265100.6	8,314
Federal Operating Grants*	1844.987	1844.987	0	56720.48	8,314
Federal Grants Other*	464.7734	1332.643	0	32667.87	8,314
Total Operating Revenues*	15394.76	16819.59	0	198373.9	8,314
Local Appropriations*	8983.359	17281.01	0	190805.9	8,314
State Appropriations*	13146.77	14924.86	0	237788	8,314
Federal Appropriations*	72.67623	633.802	0	15874.79	8,314
State Operating Grants*	2863.976	2863.976	0	39968.89	8,314
Tuition & Fees*	8681.496	11483.66	0	146425.9	8,314
Pell Grants*	8543.469	10657.8	0	240238	8,314
State Need-Based Aid*	327033.7	466043.6	0	1902162	8,571
State Merit-Based Aid*	70070.97	142577.6	0	766979.9	8,571
Total full-time, first time enrollment	6307.305	7213.222	14	100272	8,602
In-state Tuition and Fees	3230.068	1769.844	0	13412	7,858
Out-of-state Tuition and Fees	6607.381	2890.525	0	23703	7,858
State per Capita Income	42252.01	6755.355	6755.355	68329	8,571
State unemployment rate	7.0381	2.0658	2.6833	12.1417	8,571
Percent of state age 25 or older with bachelor's degree	27.4695	4.8724	16.5	41.2	8,571

** per $1,000*

Table 13 presents average statistical information for the upward mobility outcome variables. These represent the average percentage of those students who complete a credential and move up in economic quartiles ten years following the completion of the credential. The highest mean rates are seen in those rising from the bottom quintile and up two quintiles. As seen in Table 13, about 20 percent of students increase by two income quintiles from public four-year institutions. In community colleges, approximately 20 percent on average also rise by two quintiles. 17 percent on average increase by this measure in private four-year colleges and universities.

Table 13:

Average of dependent variables included in Title V upward social mobility analysis, 2010-2012

	Mean	SD	Minimum	Maximum	Observations
Increase by two, Public four year	0.2053	0.0762	0.0712	0.506	441
Increase by two, Private four year	0.1689	0.0606	0.0534	0.567	794
Increase by two, Public two year	0.1962	0.0507	0.0943	0.4132	686
1 to 5, Public four year	0.0232	0.017	0.0004	0.1293	441
1 to 5, Private four year	0.0171	0.0122	0	0.1635	794
1 to 5, Public two year	0.0164	0.0094	0.0002	0.0708	686
1 to 4, Public four year	0.0273	0.0197	0	0.129	441
1 to 4, Private four year	0.0177	0.0137	0	0.1161	794
1 to 4, Public two year	0.0298	0.0135	0.0058	0.1097	686
1 to 3, Public four year	0.026	0.0218	0.0004	0.1336	441
1 to 3, Private four year	0.0157	0.0169	0	0.1552	794
1 to 3, Public two year	0.0441	0.0235	0.0065	0.1353	686
2 to 4, Public four year	0.0408	0.0176	0.0053	0.0988	441
2 to 4, Private four year	0.0321	0.0171	0.0019	0.0019	794
2 to 4, Public two year	0.0426	0.0108	0.0152	785	686
2 to 5, Public four year	0.036	0.0161	0.0079	0.1283	441
2 to 5, Private four year	0.0323	0.0148	0.0005	0.1321	794
2 to 5, Public two year	0.026	0.0097	0.0014	0.0676	686
3 to 5, Public four year	0.052	0.0161	0.0151	0.1228	441
3 to 5, Private four year	0.0539	0.02	0.0045	0.1767	794
3 to 5, Public two year	0.0373	0.013	0.0083	0.104	686

Title V: College Completion

Tables 14-21 include results from the second stage of fuzzy regression discontinuity estimates of the relationship between the Title V HSI federal grant and college completion measures. These estimates include those for undergraduate students in public four-year institutions, private four-year institutions, and public two-year institutions using a two-stage least squares estimator. The estimates of the impact of Title V funding directly on the regression discontinuity design for all completion measures and all students in public four-year institutions and are shown in Table 14. Table 14 presents

the results of all completion measures and all students in public four-year institutions. All results from first-stage regression discontinuity design are included in Appendix B.

Throughout the analysis of Title V grant funding, the results provide some evidence that HSIs have a slightly higher percentage of college credential completion measures when compared to the HSIs just below the enrollment cutoff. This could indicate that Title V grant funding causes a modest increase in college completion as defined by credential or degree production. This finding varies based on specific credential degree and institutional sector. It also differs depending on the particular outcome variable and especially when this variable is disaggregated by race and ethnicity.

When analyzing the impact of Title V funding on any credential completion for all students, there are statistically significant results in public four and two-year institutions. As seen in Table 14 there is a significant effect on credential production in private four-year HSIs (0.03). This indicates that all credentials were higher in private four-year HSIs near the enrollment cutoff by approximately three percent when controlling for all other factors that could have an impact on the college completion outcomes included in this study when compared to private four-year emerging HSIs (those just below the 25 percent Latino/a enrollment threshold to apply for an HSI grant).

Table 14:

Fuzzy regression discontinuity estimates of the effect of Title V on all races and ethnicities and all credentials by sector

	All races, all credentials, public four year	All races, all credentials, private four year	All races, all credentials, public two year
HSI/Treatment	-0.0593	0.0289**	-0.0103
	(0.0666)	(0.0097)	(0.0305)
Latino/a Enrollment	1.1679	-2.8937*	0.2786
	(1.1508)	(1.1429)	(0.2786)
Institutional Finance (per $1,000)			
Tuition and Fees	0.0660	0.3029***	-0.0073
	(0.0467)	(0.0386)	(0.0417)
Federal Operating Grants	0.0746**	0.0221	0.0122
	(0.0268)	(0.0721)	(0.0107)
Other Federal Operating Grants	-0.0226	0.0253	-0.0016
	(0.0204)	(0.0171)	(0.0136)
State Operating Grants	-0.0147	-0.0029	-0.0160
	(0.0186)	(0.0096)	(0.0093)
Federal Appropriations	-0.0161	0.0044	0.0094
	(0.0156)	(0.0820)	(0.0129)
State Appropriations	0.0719*	0.0001	-0.0318*
	(0.0328)	(0.0009)	(0.0130)
Local Appropriations	-0.0059	-0.0059	-0.0029
	(0.0180)	(0.0180)	(0.0055)
Instructional Expenses	0.0581	0.098*	0.1543***
	(0.0541)	(0.0450)	(0.0438)
Academic Support	0.0566	0.0266	0.0140
	(0.0520)	(0.0294)	(0.0196)
Total Operating Revenues	0.0186	-0.1579***	-0.1043
	(0.0693)	(0.0457)	(0.0538)
Instutional Enrollment			
Total full-time, first time enrollment	0.8037***	0.8344***	0.8215***
	(0.0418)	(0.0235)	(0.0287)
Percent of part-time students	-0.7821***	0.3512**	-0.7086***
	(0.1906)	(0.1206)	(0.1344)
Percent of students of color	-0.1088	0.1845	-0.4706***
	(0.1412)	(0.1171)	(0.1104)
Student Financial Aid			
Pell Grants	-0.1397***	-0.1834***	0.0885***
	(0.0322)	(0.0189)	(0.0210)
State Need-Based Aid	0.0357***	-0.0109	-0.0276**
	(0.0112)	(0.0117)	(0.0102)
State Merit-Based Aid	-0.0178***	-0.0103**	0.0216***
	(0.0043)	(0.0034)	(0.0032)
Institutional Characteristics			
Selectivity	-0.0039	-0.0033*	-0.0027
	(0.0027)	(0.0016)	(0.0017)
In-state Tuition and Fees	0.3884***	-1.5603*	-0.1088**
	(0.1012)	(0.7519)	(0.0413)
Out-of-state Tuition and Fees	-0.4225***	1.5092*	0.0178
	(0.0952)	(0.7524)	(0.0386)

	All races, all credentials, public four year	All races, all credentials, private four year	All races, all credentials, public two year
State Characteristics			
Per capita Income	-0.1667	0.0266	0.0787
	(0.2343)	(0.1904)	(0.1752)
State unemployment rate	-0.026	0.0072	-0.0011
	(0.0612)	(0.0963)	(0.0942)
Percent of state age 25 or older with bachelor's degree	0.0719	0.0356	0.0961
	(0.0357)	(0.0432)	(0.1180)
Constant	1.1504	-1.5188	-0.3418
	(2.7651)	(2.1579)	(1.8361)
Year fixed effects	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes
Observations	626	1337	1174
R-squared	0.7997	0.7610	0.7373

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

When focusing specifically on baccalaureate degree production, evidence of a significant impact occurs in private four-year HSIs. As displayed in Table 15, private four-year HSIs just above the enrollment cutoff had roughly one percent more bachelor's degrees recipients when compared to emerging private four-year HSIs. Federal HSI funding could also be related to an increase in associate's degrees in HSI community colleges. As seen in Table 15, there were approximately three percent more associate's degrees amongst students of all races and ethnicities in two-year HSIs when compared to non-HSIs near the cutoff. Bachelor's degrees in public institutions and community college certificates did not appear to be statistically related to Title V funding and changes in credential and degree achievement.

Table 15:

Fuzzy regression discontinuity estimates of the effect of Title V on all races and ethnicities by credential and sector

	All races, bachelor's degrees, public four year	**All races, bachelor's degrees, private four year**	**All races, associate's degrees, public two year**	**All races, certificates, public two year**
HSI/Treatment	0.0129	0.0274*	.0543*	0.0202
	(0.0734)	(0.0051)	(0.0263)	(0.0269)
Latino/a Enrollment	-2.2249	1.2058	-0.7331	0.9562*
	(1.3135)	(0.6440)	(0.4503)	(0.4521)
Institutional Finance (per $1,000)				
Tuition and Fees	0.2129**	0.1331***	0.0848	-0.2476***
	(0.0765)	(0.0357)	(0.0681)	(0.0684)
Federal Operating Grants	0.0707	0.0121	-0.0693**	-0.0273
	(0.0442)	(0.0250)	(0.0244)	(0.0244)
Other Federal Operating Grants	-0.0777*	0.0433**	-0.0074	-0.0420
	(0.0336)	(0.0154)	(0.0272)	-(0.0420)
State Operating Grants	-0.0266	0.0221*	-0.0437*	-0.0889***
	(0.0305)	(0.0086)	(0.0217)	(0.0218)
Federal Appropriations	-0.0069	0.0024	-0.0805**	-0.0766**
	(0.0257)	(0.0280)	(0.0255)	(0.0256)
State Appropriations	-0.0292	0.0012	0.0373	0.0256
	(0.0542)	(0.0092)	(0.0235)	(0.0236)
Local Appropriations	-0.0796**	-0.0059	0.1509***	0.1754***
	(0.0297)	(0.0180)	(0.0175)	(0.0175)
Instructional Expenses	-0.0026	0.0049	-0.3113***	0.3470***
	(0.0884)	(0.0407)	(0.0754)	(0.0756)
Academic Support	0.0525	0.0326	0.0390	-0.1574***
	(0.0847)	(0.0942)	(0.0337)	(0.0338)
Total Operating Revenues	0.0873	-0.0414	0.0249	-0.1123
	(0.1145)	(0.0417)	(0.0893)	(0.0897)
Instutional Enrollment				
Total full-time, first time enrollment	0.8756***	0.9134***	0.2810***	0.2027***
	(0.0656)	(0.0215)	(0.0194)	(0.0194)
Percent of part-time students	-2.9455***	-0.1023	1.3045***	0.8974***
	(0.3064)	(0.1101)	(0.1146)	(0.1150)
Percent of students of color	0.1425	-0.3619***	0.1155	0.3820***
	(0.2221)	(0.1084)	(0.1028)	(0.1032)
Student Financial Aid				
Pell Grants	-0.1663***	-0.0351*	0.3474***	0.3683***
	(0.0494)	(0.0174)	(424.0000)	(0.0426)
State Need-Based Aid	-0.0066	-0.0022	-0.0386***	-0.0162
	(0.0182)	(0.0109)	(0.0117)	(0.0116)
State Merit-Based Aid	-0.0251***	-0.0063*	0.0002	-0.0001
	(0.0070)	(0.0030)	(0.0035)	(0.0035)
Institutional Characteristics				
Selectivity	-0.0274***	-0.0091***	0.0395***	-0.0073***
	(0.0044)	(0.0015)	(15.0000)	(0.0015)
In-state Tuition and Fees	0.0774	0.7214	-0.2435**	-0.3322***
	(0.1651)	(0.6986)	(0.0913)	(0.0916)
Out-of-state Tuition and Fees	-0.1547	-0.6321	.2387**	0.0492
	(0.1552)	(0.6990)	(0.0924)	(0.0927)

	All races, bachelor's degrees, public four year	All races, bachelor's degrees, private four year	All races, associate's degrees, public two year	All races, certificates, public two year
State Characteristics				
Per capita Income	0.5652	-0.3926*	-0.5828**	0.2604
	(0.3659)	(0.1700)	(0.1926)	(0.1933)
State unemployment rate	-0.0794	-0.1091	0.0983	-0.0501
	(0.0812)	(0.1266)	(0.1480)	(0.1072)
Percent of state age 25 or older with bachelor's degree	-0.0811	0.0752	0.0411	0.0722
	(0.0962)	(0.0653)	(0.0718)	(0.0838)
Constant	-6.8021	1.9291	5.5344**	0.2873
	(3.9366)	(1.7635)	(1.9626)	(1.9701)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Observations	626	1337	1174	1174
R-squared	0.6737	0.8344	0.4899	0.4275

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

A different picture emerges when disaggregating college completion outcome variables by race and ethnicity. The assumption would be that an HSI should have a larger number of Latino/a students receiving college credentials when compared to non-HSIs, as these students are the target student population for many federally funded programs in HSIs. As seen in Table 16, this assumption is largely supported through this study's findings. In each completion category, there is a highly statistically significant relationship between Title V funding and Latino/a students obtaining credentials and degrees. Public four-year HSIs produced approximately ten percent more bachelor's degrees compared to emerging public four-year HSIs. Private four-year HSIs had twelve percent more bachelor's degrees than private four-hear emerging HSIs. Both associate's degrees and certificates in public HSI community colleges were roughly seven percent higher than those credentials in non-HSI community colleges. These results mostly held for other model functional forms and alternative specifications as found in Appendix A.

Table 16:

Fuzzy regression discontinuity estimates of the effect of Title V on all Latino/a completers by credential and sector

	Latino/a, bachelor's degrees, public four year	**Latino/a, bachelor's degrees, private four year**	**Latino/a, associate's degrees, public two year**	**Latino/a, certificates, public two year**
HSI/Treatment	0.0634***	0.0706***	0.0799***	0.0984***
	(0.0006)	(0.0008)	(0.0007)	(0.0084)
Latino/a Enrollment	-10.4025***	-8.2425**	-0.6733**	2.1616***
	(2.9013)	(2.6714)	(0.2605)	(0.3181)
Institutional Finance (per $1,000)				
Tuition and Fees	0.2220	0.0070	0.2774***	0.1462*
	(0.1176)	(0.0901)	(0.0468)	(0.0572)
Federal Operating Grants	0.0542	0.0444	-0.0561***	-0.0482*
	(0.0676)	(0.0666)	(0.0175)	(0.0214)
Other Federal Operating Grants	-0.0042	0.0571	0.0208	-0.0196
	(0.0515)	(0.0399)	(0.0196)	(0.0239)
State Operating Grants	0.0420	-0.0753***	0.0156	-0.0665***
	(0.0468)	(0.0224)	(0.0152)	(0.0185)
Federal Appropriations	-0.0150	-0.0111	-0.0427*	-0.0341
	(0.0393)	(0.0999)	(0.0184)	(0.0224)
State Appropriations	-0.0968	-0.0622	-0.0432*	-0.0307
	(0.0827)	(0.0966)	(0.0171)	(0.0209)
Local Appropriations	-0.1045	-0.1045	0.0576***	0.0041
	(0.0454)	(0.0454)	(0.0111)	(0.0136)
Instructional Expenses	0.3405*	0.1991	0.0256	0.2477***
	(0.1364)	(0.1051)	(0.0549)	(0.0671)
Academic Support	-0.3189*	0.0116	-0.0163	0.0241
	(0.1311)	(0.0282)	(0.0245)	(0.0299)
Total Operating Revenues	0.0725	-0.0504	-0.1987**	-0.2372**
	(0.1748)	(0.1067)	(0.0650)	(0.0794)
Instutional Enrollment				
Total full-time, first time enrollment	1.0725***	.6299***	0.1215***	0.1919***
	(0.1053)	(0.0548)	(0.0142)	(0.0174)
Percent of part-time students	-0.4108	0.1189	0.0214	-0.1039
	(0.4804)	(0.2818)	(0.0810)	(0.0989)
Percent of students of color	0.0377	-0.3049	0.1795*	0.2535**
	(0.3559)	(0.2737)	(0.0750)	(0.0915)
Student Financial Aid				
Pell Grants	-0.3457***	-0.0649	-0.0270	-0.0694
	(0.0811)	(0.0443)	(0.0293)	(0.0358)
State Need-Based Aid	0.0571*	0.0593*	0.0074	-0.0102
	(0.0281)	(0.0275)	(0.0084)	(0.0103)
State Merit-Based Aid	-0.0294**	-0.0181*	0.0022	-0.0035
	(0.0107)	(0.0079)	(0.0025)	(0.0030)

	Latino/a, bachelor's degrees, public four year	Latino/a, bachelor's degrees, private four year	Latino/a, associate's degrees, public two year	Latino/a, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0062	-0.0111**	0.0021	-0.0093***
	(0.0069)	(0.0037)	(0.0012)	(0.0014)
In-state Tuition and Fees	-0.9677***	0.9429	-0.0672	-0.0337
	(0.2550)	(1.7570)	(0.0646)	(0.0788)
Out-of-state Tuition and Fees	0.7458**	-1.0419	0.0016	-0.1108
	(0.2400)	(1.7587)	(0.0650)	(0.0794)
State Characteristics				
Per capita Income	4.082***	2.2628***	1.0694***	1.0279***
	(0.5907)	(0.4450)	(0.1395)	(0.1703)
State unemployment rate	-0.0990	-0.1094	0.0665	-0.0452
	(0.0721)	(0.1269)	(0.146)	(0.1072)
Percent of state age 25 or older with bachelor's degree	-0.0669	0.0450	0.0367	0.0511
	(0.0800)	(0.0998)	(0.0615)	(0.0427)
Constant	-53.1050***	-30.2868***	-12.2488***	-9.2589***
	(6.9712)	(5.0439)	(1.4351)	(1.7520)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Observations	626	1337	1174	1174
R-squared	0.2862	0.3771	0.0791	0.2309

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

An interesting empirical pattern appears when the model is estimated for subsamples of the primary research design sample based on race and ethnicity beyond Latino/a students. Tables 17-21 display the findings when this analysis is disaggregated for non-Latino/a races and ethnicities in public four and two-year HSIs and private four-year HSIs.

As displayed in Table 17, there is a highly statistically significant relationship between Asian American and Pacific Islander credential and degree completion in all

sectors included in this study. Asian American and Pacific Islander students obtained eight percent more baccalaureate degrees from both public four-year schools and private four-year HSIs when compared to those sectors in non-HSIs. This student population had three percent more associate's degrees and four percent more community college certificates as compared to Asian American and Pacific Islander students in non-HSI community colleges near the enrollment cutoff.

Table 17:

Fuzzy regression discontinuity estimates of the effect of Title V on all Asian American and Pacific Islander completers by credential and sector

	AAPI, bachelor's degrees, public four year	**AAPI, bachelor's degrees, private four year**	**AAPI, associate's degrees, public two year**	**AAPI, certificates, public two year**
HSI/Treatment	0.0880***	0.0807***	0.0910***	0.0599***
	(0.0006)	(0.0007)	(0.0004)	(0.0006)
Latino/a Enrollment	-13.5123***	-7.9459***	-0.8588***	-1.3375***
	(2.7808)	(2.0826)	(0.1787)	(0.2138)
Institutional Finance (per $1,000)				
Tuition and Fees	0.1765	-0.0742	0.2852***	0.0362*
	(0.0647)	(0.0702)	(0.0321)	(0.0372)
Federal Operating Grants	-0.0051	-0.0066	-0.0499***	-0.0282*
	(0.0493)	(0.0245)	(0.0120)	(0.0014)
Other Federal Operating Grants	-0.0051	0.0518	0.0524***	-0.0086
	(0.0493)	(0.0311)	(0.0134)	(0.0039)
State Operating Grants	0.0872	-0.0817***	0.0283**	-0.4665***
	(0.0449)	(0.0175)	(0.0104)	(0.0075)
Federal Appropriations	0.0133	0.0342	-0.0200	-0.0141
	(0.0376)	(0.0661)	(0.0126)	(0.0024)
State Appropriations	-0.0776	-0.0679	-0.0494***	-0.0107
	(0.0793)	(0.0881)	(0.0117)	(0.0209)
Local Appropriations	-0.0604	-0.0422	0.0660***	0.0011
	(0.0435)	(0.0490)	(0.0076)	(0.0026)
Instructional Expenses	0.2316	0.2836***	-0.0350***	0.0477***
	(0.1307)	(0.0819)	(0.0063)	(0.0471)
Academic Support	-0.2579*	-0.0446	-0.0013	0.0041
	(0.1256)	(0.0892)	(0.0168)	(0.0099)
Total Operating Revenues	0.2319	0.0177	-0.2659***	-0.0372**
	(0.1675)	(0.0832)	(0.0446)	(0.0594)
Instutional Enrollment				
Total full-time, first time enrollment	1.2679***	0.6270***	0.1106***	0.0819***
	(0.1009)	(0.0427)	(0.0097)	(0.0064)
Percent of part-time students	0.1490	-0.2914	0.1489**	-0.0039
	(0.4605)	(0.2197)	(0.0556)	(0.0789)
Percent of students of color	0.9075	0.0560	0.2626***	0.0535**
	(0.3411)	(0.2134)	(0.0514)	(0.0005)
Student Financial Aid				
Pell Grants	-0.5030***	-0.1707***	-0.0350	-0.0394
	(0.0777)	(0.0345)	(0.0201)	(0.0258)
State Need-Based Aid	0.0658*	0.0475*	0.0022	-0.0820
	(0.0269)	(0.0214)	(0.0058)	(0.0830)
State Merit-Based Aid	-0.0265*	-0.0265***	-0.0037*	-0.0015
	(0.0102)	(0.0061)	(0.0017)	(0.0010)

	AAPI, bachelor's degrees, public four year	AAPI, bachelor's degrees, private four year	AAPI, associate's degrees, public two year	AAPI, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0038	-0.0068*	0.0031***	-0.0093***
	(0.0066)	(0.0029)	(0.0008)	(0.0001)
In-state Tuition and Fees	-0.9462***	1.7279	-0.4028***	-0.0137
	(0.2444)	(1.3701)	(0.0443)	(0.0788)
Out-of-state Tuition and Fees	0.901***	-1.8195	0.3552***	-0.0098
	(0.2301)	(1.3711)	(0.0446)	(0.0594)
State Characteristics				
Per capita Income	4.2992***	2.1996***	1.0868***	1.0012***
	(0.5661)	(0.3469)	(0.0957)	(0.0822)
State unemployment rate	-0.1200	-0.1281	0.1188	-0.0702
	(0.1291)	(0.1266)	(0.1989)	(0.0991)
Percent of state age 25 or older with bachelor's degree	-0.0758	0.0822	0.0252	0.0528
	(0.0743)	(0.0942)	(0.0506)	(0.0504)
Constant	-60.5988***	-29.2249***	-12.3425***	-10.5463***
	(6.6817)	(3.9322)	(0.9844)	(2.9987)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Observations	626	1337	1174	1174
R-squared	0.3625	0.0823	0.2820	0.2677

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

Results for the other racial and ethnic groups varied. Throughout all sectors of postsecondary education, American Indian and Alaska Native students tend to display lower graduation rates. Title V-grant funding appears to have led to increases in their college completion as displayed in Table 18. There was a four percent increase in American Indian and Alaska Native students obtaining bachelor's degrees from public four-year HSIs and a two percent increase in these students being awarded community college certificates.

Table 18:

Fuzzy regression discontinuity estimates of the effect of Title V on all American Indian and Alaska Native completers by credential and sector

	AIAN, bachelor's degrees, public four year	**AIAN, bachelor's degrees, private four year**	**AIAN, associate's degrees, public two year**	**AIAN, certificates, public two year**
HSI/Treatment	0.0873***	0.0257	0.0477	0.0109*
	(0.0014)	(0.0079)	(0.0077)	(0.0097)
Latino/a Enrollment	-6.4019***	-0.7367	-0.0677	0.3566
	(1.8908)	(0.9351)	(0.2911)	(0.3658)
Institutional Finance (per $1,000)				
Tuition and Fees	0.0362*	0.1644**	0.0399	0.1622*
	(0.0172)	(0.0266)	(0.0473)	(0.0922)
Federal Operating Grants	-0.0282*	0.0608	0.0782	0.0882*
	(0.0014)	(0.0346)	(0.0864)	(0.0184)
Other Federal Operating Grants	-0.0086	-0.0455*	.0419*	-0.0631*
	(0.0119)	(0.0126)	(0.0154)	(0.0271)
State Operating Grants	-0.4665***	-0.0066	0.0041	-0.0207
	(0.0075)	(0.0205)	(0.0043)	(0.0237)
Federal Appropriations	-0.0141	-0.0086	0.0090	-0.0051
	(0.0024)	(0.0257)	(0.2550)	(0.0183)
State Appropriations	-0.0107	-0.0292	-0.0122	-0.0384
	(0.0009)	(0.0342)	(0.0595)	(0.0495)
Local Appropriations	0.0011	-0.0596**	-0.0424*	-0.0687*
	(0.0026)	(0.0097)	(0.0198)	(0.0227)
Instructional Expenses	0.1377***	-0.0006	0.0990	0.1007
	(0.0521)	(0.0284)	(0.0869)	(0.0881)
Academic Support	0.0041	0.0225	-0.0566	-0.0778
	(0.0099)	(0.0347)	(0.0882)	(0.0843)
Total Operating Revenues	-0.1172**	0.0573	-0.0502	0.0859
	(0.0624)	(0.0945)	(0.0579)	(0.1158)

Instutional Enrollment				
Total full-time, first time enrollment	0.0819***	0.6656***	0.9332***	0.8296***
	(0.0024)	(0.0246)	(0.0349)	(0.0658)
Percent of part-time students	-0.0039	-2.0455***	0.3939*	-2.0040***
	(0.0489)	(0.1264)	(0.1793)	(0.3157)
Percent of students of color	0.1235**	0.1025	-3.9489***	-3.1194***
	(0.0005)	(0.1721)	(0.1741)	(0.2161)
Student Financial Aid				
Pell Grants	-0.0394	-0.1063***	-0.0533	-0.0852**
	(0.0258)	(0.0294)	(0.0282)	(0.0183)
State Need-Based Aid	-0.0820	-0.0456	-0.0102	0.0003
	(0.0830)	(0.0062)	(0.0175)	(0.0102)
State Merit-Based Aid	-0.0015	-0.0021***	-0.0126*	-0.0097*
	(0.0010)	(0.0020)	(0.0050)	(0.0027)
Institutional Characteristics				
Selectivity	-0.0063***	-0.0044***	-0.0076***	-0.0091***
	(0.0001)	(0.0004)	(0.0023)	(0.0029)
In-state Tuition and Fees	-0.0137	0.0474	0.3085	-0.0952
	(0.0588)	(0.1251)	(1.1181)	(0.0835)
Out-of-state Tuition and Fees	-0.0098	-0.1147	0.2972	0.0078
	(0.0594)	(0.1052)	(1.1189)	(0.1427)
State Characteristics				
Per capita Income	1.0008***	0.4252	-0.0019	1.1231**
	(0.0822)	(0.1359)	(0.2831)	(0.4051)
State unemployment rate	-0.0978	-0.1192	0.0884	-0.0992
	(0.0614)	(0.1263)	(0.1882)	(0.1144)
Percent of state age 25 or older with bachelor's degree	-0.0120	0.0204	0.0141	0.0483
	(0.0369)	(0.0888)	(0.0495)	(0.0717)
Constant	-7.2608	-0.6792	-1.6354	-2.7435
	(4.5432)	(1.7656)	(1.6033)	(2.0146)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Observations	626	1337	1174	1174
R-squared	0.3294	0.1961	0.6619	0.4054

Note: Clustered standard errors in parentheses.

**p< .05 **p< .01 ***p< .001*

Black students also tend to graduate at a lower rate when compared to other races and ethnicities. As displayed in Table 19, there is evidence of a statistically significant relationship between HSI funding and Black students graduating from HSIs in some completion variables. There was a four percent increase in Black students obtaining public baccalaureate degrees, a five percent increase in Black students earning bachelor's degrees from private not-for-profit four-year HSIs, and a two percent increase for Black students obtaining community college certificates in HSIs when compared to Black students in non-HSIs near the enrollment cutoff.

Table 19:

Fuzzy regression discontinuity estimates of the effect of Title V on all Black and African American completers by credential and sector

	Black, bachelor's degrees, public four year	**Black,, bachelor's degrees, private four year**	**Black, associate's degrees, public two year**	**Black, certificates, public two year**
HSI/Treatment	0.0641***	0.0693***	0.4778	0.0109*
	(0.0012)	(0.0020)	(0.7729)	(0.0097)
Latino/a Enrollment	-10.6807***	-8.1926***	-0.0677	0.3566
	(1.9383)	(1.5054)	(0.2911)	(0.3658)
Institutional Finance (per $1,000)				
Tuition and Fees	0.1224	0.0060	0.1852***	-0.2276***
	(0.1276)	(0.0801)	(0.0221)	(0.0644)
Federal Operating Grants	0.0442	0.0344	-0.0399***	-0.0223
	(0.0576)	(0.0566)	(0.0020)	(0.0204)
Other Federal Operating Grants	-0.0032	0.0471	0.0424***	-0.0320
	(0.0415)	(0.0299)	(0.0034)	-(0.0310)
State Operating Grants	0.0320	-0.0653***	0.0263**	-0.0789***
	(0.0368)	(0.0124)	(0.0094)	(0.0118)
Federal Appropriations	-0.0140	-0.0011	-0.0100	-0.0666**
	(0.0383)	(0.0899)	(0.0116)	(0.0156)
State Appropriations	-0.0868	-0.0522	-0.0394***	0.0156
	(0.0727)	(0.0866)	(0.0017)	(0.0136)
Local Appropriations	-0.0945	-0.0945	0.0560***	0.1454***
	(0.0354)	(0.0354)	(0.0006)	(0.0075)
Instructional Expenses	0.3305*	0.0991	-0.0250***	0.3270***
	(0.1253)	(0.0951)	(0.0023)	(0.0726)
Academic Support	-0.2189*	0.0016	-0.0003	-0.0574***
	(0.0311)	(0.0182)	(0.0068)	(0.0038)
Total Operating Revenues	0.0625	-0.0404	-0.2559***	-0.1023
	(0.1648)	(0.0967)	(0.0346)	(0.0797)
Instutional Enrollment				
Total full-time, first time enrollment	1.0525***	.5299***	0.1006***	0.1027***
	(0.0953)	(0.0448)	(0.0017)	(0.0094)
Percent of part-time students	-0.3108	0.1089	0.1389**	0.7974***
	(0.3804)	(0.2718)	(0.0456)	(0.0150)
Percent of students of color	0.0277	-0.2949	0.2226***	0.2820***
	(0.2559)	(0.1737)	(0.0114)	(0.0032)
Student Financial Aid				
Pell Grants	-0.2457***	-0.0549	-0.0250	0.2683***
	(0.0611)	(0.0343)	(0.0301)	(0.0226)
State Need-Based Aid	0.0471*	0.0493*	0.0012	-0.0062
	(0.0181)	(0.0175)	(0.0048)	(0.0016)
State Merit-Based Aid	-0.0194**	-0.0081*	-0.0027*	-0.0001
	(0.0970)	(0.0029)	(0.0007)	(0.0012)

	Black, bachelor's degrees, public four year	Black,, bachelor's degrees, private four year	Black, associate's degrees, public two year	Black, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0052	-0.0011**	0.0021***	-0.0133***
	(0.0059)	(0.0007)	(0.0001)	(0.0005)
In-state Tuition and Fees	-0.8677***	0.9329	-0.3028***	-0.2322***
	(0.1550)	(1.7470)	(0.0243)	(0.0416)
Out-of-state Tuition and Fees	0.6458**	-1.0319	0.2552***	0.0392
	(0.1400)	(1.6587)	(0.0246)	(0.0827)
State Characteristics				
Per capita Income	3.0222***	2.1628***	1.0264***	0.1604
	(0.3812)	(0.3450)	(0.0846)	(0.0933)
State unemployment rate	-0.0799	-0.1098	0.0988	-0.0502
	(0.0894)	(0.1265)	(0.1480)	(0.1078)
Percent of state age 25 or older with bachelor's degree	-0.0999	0.0114	0.0110	0.0521
	(0.0924)	(0.0200)	(0.0501)	(0.0926)
Constant	-15.5943***	-13.4514***	-1.6354	-2.7435
	(4.6574)	(2.8424)	(1.6033)	(2.0146)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Observations	626	1337	1174	1174
R-squared	0.6870	0.6018	0.6619	0.4054

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

As presented in Table 20, the relationship between federal HSI funding and completion measures amongst White students was most pronounced in bachelor's degrees in private four-year HSIs (six percent higher in HSIs compared to non-HSIs). There was a four percent higher number of bachelor's degrees in public four-year HSIs compared to non-HSIs and two percent more community college certificates in HSIs.

Enrollment of non-resident alien students has been steadily increasing through U.S. higher education in all sectors. Similar to other races and ethnicities, these students

also appear to have been positively affected by Title V funding. As Table 21 displays, there was a three percent increase in non-resident alien students obtaining bachelor's degrees from public four-year HSIs, a four percent increase in private four-year HSIs bachelor's degree attainment, a one percent increase in these students earning associate's degrees, and nine percent increase in their completion of community college certificates.

Table 20:

Fuzzy regression discontinuity estimates of the effect of Title V on all White, non-Hispanic completers by credential and sector

	White, bachelor's degrees, public four year	**White, bachelor's degrees, private four year**	**White, associate's degrees, public two year**	**White, certificates, public two year**
HSI/Treatment	0.0681**	0.0263***	1.0122	0.0109*
	(0.0020)	(0.0005)	(1.6640)	(0.0097)
Latino/a Enrollment	-5.3918*	-5.1361**	-2.2245	1.0412***
	(2.0879)	(1.6995)	(1.2335)	(0.1222)
Institutional Finance (per $1,000)				
Tuition and Fees	0.1807*	0.0499	0.2644**	0.0462*
	(0.0846)	(0.0573)	(0.0966)	(0.0472)
Federal Operating Grants	0.0983*	0.0882	0.0708	-0.0382*
	(0.0486)	(0.0964)	(0.0446)	(0.0114)
Other Federal Operating Grants	-0.0731*	.0619*	-0.0555*	-0.0096
	(0.0371)	(0.0254)	(0.0226)	(0.0139)
State Operating Grants	-0.0307	0.0051	-0.0166	-0.5665***
	(0.0337)	(0.0143)	(0.0405)	(0.0085)
Federal Appropriations	-0.0151	0.0100	-0.0096	-0.0241
	(0.0283)	(0.3660)	(0.0357)	(0.0124)
State Appropriations	-0.0484	-0.0222	-0.0392	-0.0207
	(0.0595)	(0.0495)	(0.0442)	(0.0109)
Local Appropriations	-0.0787*	-0.0524*	-0.0696**	0.0021
	(0.0327)	(0.0398)	(0.0197)	(0.0036)
Instructional Expenses	0.1107	0.1090	-0.0016	0.1477***
	(0.0981)	(0.0669)	(0.0784)	(0.0571)
Academic Support	-0.0878	-0.0666	0.0425	0.0141
	(0.0943)	(0.0982)	(0.0747)	(0.0199)
Total Operating Revenues	0.0959	-0.0402	0.0673	-0.1372**
	(0.1258)	(0.0679)	(0.1045)	(0.0694)
Instutional Enrollment				
Total full-time, first time enrollment	0.9296***	0.9332***	0.7756***	0.0919***
	(0.0758)	(0.0349)	(0.0556)	(0.0074)
Percent of part-time students	-2.0240***	0.3939*	-2.8455***	-0.0139
	(0.3457)	(0.1793)	(0.2964)	(0.0889)
Percent of students of color	-3.1494***	-3.9489***	0.1425	0.1535**
	(0.2561)	(0.1741)	(0.2221)	(0.0015)
Student Financial Aid				
Pell Grants	-0.1852**	-0.0533	-0.1563***	-0.0494
	(0.0583)	(0.0282)	(0.0594)	(0.0358)
State Need-Based Aid	0.0013	-0.0102	-0.0566	-0.0920
	(0.0202)	(0.0175)	(0.0082)	(0.0930)
State Merit-Based Aid	-0.0197*	-0.0126*	-0.0151***	-0.0025
	(0.0077)	(0.0050)	(0.0060)	(0.0010)

	White, bachelor's degrees, public four year	White, bachelor's degrees, private four year	White, associate's degrees, public two year	White, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0191***	-0.0076***	-0.0174***	-0.0083***
	(0.0049)	(0.0023)	(0.0034)	(0.0004)
In-state Tuition and Fees	-0.1052	0.3085	0.0674	-0.0237
	(0.1835)	(1.1181)	(0.1551)	(0.0688)
Out-of-state Tuition and Fees	0.0098	0.2972	-0.1447	-0.0108
	(0.1727)	(1.1189)	(0.1452)	(0.0694)
State Characteristics				
Per capita Income	1.1631**	-0.0019	0.5552	1.0112***
	(0.4251)	(0.2831)	(0.3559)	(0.0922)
State unemployment rate	-0.0793	-0.1092	0.0989	-0.0905
	(0.0844)	(0.1266)	(0.1883)	(0.1066)
Percent of state age 25 or older with bachelor's degree	-0.0322	0.0132	0.0244	0.0229
	(0.0428)	(0.0266)	(0.0326)	(0.0312)
Constant	-14.9576**	-3.9836	-1.6354	-2.7435
	(5.0168)	(3.2089)	(1.6033)	(2.0146)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Observations			1174	1174
R-squared	0.6621	0.6385	0.6619	0.4054

Note: Clustered standard errors in parentheses.

**p< .05 **p< .01 ***p< .001*

Table 21:

Fuzzy regression discontinuity estimates of the effect of Title V on all Non-resident Student Alien completers by credential and sector

	NRA, bachelor's degrees, public four year	**NRA, bachelor's degrees, private four year**	**NRA, associate's degrees, public two year**	**NRA, certificates, public two year**
HSI/Treatment	0.0859*	0.0589*	.0153**	0.0805**
	(0.0020)	(0.0047)	(0.0035)	(0.0027)
Latino/a Enrollment	-4.1635*	-3.7101*	-0.2589	-0.1429
	(2.0736)	(1.7239)	(0.1343)	(0.1040)
Institutional Finance (per $1,000)				
Tuition and Fees	0.1652	0.0332***	0.1651***	0.1261*
	(0.0856)	(0.0252)	(0.0120)	(0.0470)
Federal Operating Grants	-0.0041	0.0024	-0.0298***	-0.0280*
	(0.0393)	(0.0151)	(0.0011)	(0.0112)
Other Federal Operating Grants	-0.0041	0.0332**	0.0322***	-0.0094
	(0.0393)	(0.0052)	(0.0012)	(0.0138)
State Operating Grants	0.0772	0.0120*	0.0162**	-0.0464***
	(0.0349)	(0.0074)	(0.0072)	(0.0165)
Federal Appropriations	0.0033	0.0014	-0.0091	-0.0247
	(0.0276)	(0.0180)	(0.0102)	(0.0124)
State Appropriations	-0.0676	0.0010	-0.0292***	-0.0206
	(0.0693)	(0.0082)	(0.0010)	(0.0108)
Local Appropriations	-0.0504	-0.0029	0.0460***	0.0028
	(0.0535)	(0.0072)	(0.0002)	(0.0102)
Instructional Expenses	0.2016	0.0029	-0.0150***	0.1489***
	(0.1107)	(0.0207)	(0.0012)	(0.0572)
Academic Support	-0.1579*	0.0126	-0.0002	0.0142
	(0.1056)	(0.0742)	(0.0056)	(0.0199)
Total Operating Revenues	0.1319	-0.0214	-0.1558***	-0.1378**
	(0.1175)	(0.0217)	(0.0144)	(0.0692)
Instutional Enrollment				
Total full-time, first time enrollment	1.0679***	0.9034***	0.0094***	0.1820***
	(0.0099)	(0.0205)	(0.0002)	(0.0206)
Percent of part-time students	0.1290	-0.0921	0.1182**	-0.0938
	(0.3605)	(0.1002)	(0.0362)	(0.0782)
Percent of students of color	0.8075	-0.3417***	0.1223***	0.2232**
	(0.2411)	(0.0982)	(0.0098)	(0.0612)
Student Financial Aid				
Pell Grants	-0.4030***	-0.0250*	-0.0144	-0.0492
	(0.0677)	(0.0072)	(0.0102)	(0.0152)
State Need-Based Aid	0.0558*	-0.0012	0.0002	-0.0098
	(0.0169)	(0.0980)	(0.0082)	(0.0096)
State Merit-Based Aid	-0.0065*	-0.0042*	-0.0017*	-0.0015
	(0.0120)	(0.0020)	(0.0001)	(0.0022)

	NRA, bachelor's degrees, public four year	NRA, bachelor's degrees, private four year	NRA, associate's degrees, public two year	NRA, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0028	-0.0070***	0.0019***	-0.0064***
	(0.0056)	(0.0008)	(0.0001)	(0.0004)
In-state Tuition and Fees	-0.8462***	0.7012	-0.2926***	-0.0236
	(0.1444)	(0.5968)	(0.0146)	(0.0882)
Out-of-state Tuition and Fees	0.8012***	-0.5322	0.1558***	-0.1004
	(0.1301)	(0.5998)	(0.0140)	(0.0695)
State Characteristics				
Per capita Income	3.2992***	-0.2924*	0.9262***	1.0004***
	(0.4662)	(0.1922)	(0.0488)	(0.1408)
State unemployment rate	-0.1284	-0.1662	0.1024	-0.0401
	(0.2802)	(0.1843)	(0.1048)	(0.1029)
Percent of state age 25 or older with bachelor's degree	-0.0326	0.0414	0.0191	0.0480
	(0.0486)	(0.0655)	(0.0527)	(0.0793)
Constant	-20.1128***	-14.4674***	-5.9483***	-2.1861***
	(4.9825)	(3.2550)	(0.7397)	(0.5728)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Observations	626	1337	1174	1174
R-squared	0.5451	0.3354	0.2579	0.0850

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

Title III: College Completion

While Title V of the Higher Education focuses exclusively on HSIs, Title III in relation to Strengthening Institutions directs funding to several categories of MSIs. As explained in the chapter three, this study uses a multiple cutoff regression discontinuity design to account for the many enrollment thresholds at which these institutions become eligible for MSI funding.

Tables 22-29 include results from the second stage of fuzzy regression discontinuity estimates of the relationship between Title III federal MSI grants and college completion measures for undergraduate students in public four-year institutions, private four-year institutions, and public two-year institutions using a two-stage least squares estimator. Results from the impact of Title III funding on the regression discontinuity design for all completion measures and all students in public four-year institutions and are shown in Table 22. This includes public four-year, private four-year, and public two-year institutions categorized as MSIs according to Title III. All results from the first-stage of the fuzzy regression discontinuity design are included in Appendix B.

As in the case of Title V funding, Title III funding towards MSIs appears to provide evidence that Title III funding causes an increase in college completion as defined by credential or degree production. This finding varies based on specific credential degree and institutional sector. It also differs depending on the particular outcome variable and especially when this variable is disaggregated by race and ethnicity.

Table 22:

Fuzzy regression discontinuity estimates of the effect of Title III on all races and ethnicities and all credentials by sector

	All races, all credentials, public four year	**All races, all credentials, private four year**	**All races, all credentials, public two year**
MSI/Treatment	0.0166	0.0148	0.0972
	(0.8556)	(0.3622)	(0.5554)
Minority Enrollment	-0.2228	9.8996	3.8325
	(1.0137)	(21.2805)	(0.8464)
Institutional Finance (per $1,000)			
Tuition and Fees	0.0114	-0.0978	-0.1662
	(0.0236)	(0.1197)	(0.2115)
Federal Operating Grants	0.01593**	0.0201	0.0347
	(0.0055)	(0.0166)	(0.0581)
Other Federal Operating Grants	0.0126	-0.0689	0.1179
	(0.0076)	(0.0255)	(0.1226)
State Operating Grants	0.0131**	-0.0491***	0.0257
	(0.0049)	(0.0462)	(0.0368)
Federal Appropriations	-0.0044	0.0407	-0.0341
	(0.0058)	(0.0488)	(0.0462)
State Appropriations	0.0058	-0.0299	-0.1431*
	(0.0064)	(0.0366)	(0.0636)
Local Appropriations	-0.0077	0.1044***	0.1188***
	(0.0054)	(0.0449)	(0.0214)
Instructional Expenses	0.0502*	0.0205***	0.0259
	(0.0197)	(0.0003)	(0.1209)
Academic Support	0.0001	0.0208	-0.0035
	(0.0009)	(0.0533)	(0.0660)
Total Operating Revenues	-0.0297	0.0657	-0.1009
	(0.0267)	(0.0939)	(0.1232)
Instutional Enrollment			
Total full-time, first time enrollment	0.0260*	0.1258***	0.1335***
	(0.0132)	(0.0678)	(0.0230)
Percent of part-time students	0.1726**	0.5222***	.9202***
	(0.0643)	(0.0821)	(0.0858)
Percent of students of color	.9904***	0.9157	2.1877*
	(0.0206)	(0.9772)	(0.9634)
Student Financial Aid			
Pell Grants	-0.0191	0.4584***	0.6197**
	(0.0135)	(0.0268)	(0.0966)
State Need-Based Aid	-0.0042	-0.0213	0.0063
	(0.0023)	(0.0092)	(0.0050)
State Merit-Based Aid	0.0006	0.0021	-0.0119
	(0.0017)	(0.0040)	(0.0102)

	All races, all credentials, public four year	All races, all credentials, private four year	All races, all credentials, public two year
Institutional Characteristics			
Selectivity	0.0001	0.0057***	0.0086***
	(0.0009)	(0.0001)	(0.0009)
In-state Tuition and Fees	-0.0235	0.1078	-1.1398*
	(0.0412)	(0.1680)	(0.0849)
Out-of-state Tuition and Fees	0.0278	0.8522	1.2170*
	(0.0360)	(0.2480)	(0.0884)
State Characteristics			
Per capita Income	0.2427**	-0.1919***	-0.0887
	(0.0770)	(0.0024)	(0.8262)
State unemployment rate	-0.0660	0.0044	-0.0089
	(0.0844)	(0.0621)	(0.0522)
Percent of state age 25 or older with bachelor's degree	0.0432	0.0536	0.0712
	(0.0951)	(0.0864)	(0.1010)
Year fixed effects	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes
Constant	-2.8722***	-0.6645	-8.0582
	(0.8224)	(0.3419)	(8.8556)
Observations	693	1,390	1,016
R-squared	0.6916	0.0689	0.2225

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

As displayed in Table 23, Title III MSIs showed an eight percent increase in associate's degrees for all races and ethnicities compared to those institutions that did not receive Title III MSI funding. Completion of certificates in all Title III MSIs increased by four percent amongst all students. There was a statistically insignificant relationship between Title III MSI funding and completion of baccalaureate degrees in public and private four-year institutions.

Table 23:

Fuzzy regression discontinuity estimates of the effect of Title III on all races and ethnicities by credential and sector

	All races, bachelor's degrees, public four year	**All races, bachelor's degrees, private four year**	**All races, associate's degrees, public two year**	**All races, certificates, public two year**
MSI/Treatment	-0.5479	0.1055	0.0376***	0.0674***
	(0.7938)	(2.0002)	(0.0664)	(0.0034)
Minority Enrollment	-0.9023	-0.0434	-0.9169***	-0.6002**
	(0.4777)	(0.3419)	(0.2595)	(0.2090)
Institutional Finance (per $1,000)				
Tuition and Fees	0.2145	-0.1022	-0.1078	-0.1195
	(0.1100)	(0.0966)	(0.0897)	(0.0722)
Federal Operating Grants	-0.0048	-0.0256	0.0501	0.0426*
	(0.0293)	(0.0347)	(0.0266)	(0.0214)
Other Federal Operating Grants	0.0275	-0.0281	-0.0789	-0.0383
	(0.0363)	(0.0406)	(0.0455)	(0.0366)
State Operating Grants	-0.0333	-0.0447	-0.0991***	-0.0462*
	(0.0255)	(0.0315)	(0.0262)	(0.0211)
Federal Appropriations	0.0097	0.0082	0.0207	0.0441
	(0.0274)	(0.0630)	(0.0419)	(0.0337)
State Appropriations	-0.0510	-0.0639***	-0.0199	-0.0106
	(0.0299)	(0.0095)	(0.0266)	(0.0214)
Local Appropriations	-0.1011***	-0.1261**	0.2044***	0.1626***
	(0.0256)	(0.0116)	(0.0149)	(0.0120)
Instructional Expenses	-0.1888	-0.1844	-0.4054***	0.1728*
	(0.0993)	(0.1237)	(0.1003)	(0.0808)
Academic Support	0.0357	0.0817	0.0108	-0.0417
	(0.1053)	(0.0767)	(0.0433)	(0.0349)
Total Operating Revenues	0.1811	0.1168*	0.0457	0.1882**
	(0.1254)	(0.0757)	(0.1239)	(0.0997)
Instutional Enrollment				
Total full-time, first time enrollment	0.7737***	0.4525***	0.1958***	0.3419***
	(0.0658)	(0.0426)	(0.0259)	(0.0209)
Percent of part-time students	-3.1928***	-1.8803***	1.5155***	0.9092***
	(0.3324)	(0.1664)	(0.1216)	(0.0979)
Percent of students of color	1.2445**	1.0892***	0.2157	0.4642***
	(0.4126)	(0.6476)	(0.1772)	(0.1427)
Student Financial Aid				
Pell Grants	-0.1215	0.4368***	0.5589***	0.4389***
	(0.0648)	(0.0246)	(0.0641)	(0.0516)
State Need-Based Aid	0.0294*	0.0162**	-0.0113	-0.0108
	(0.0113)	(0.0088)	(0.0082)	(0.0066)
State Merit-Based Aid	-0.0095	-0.0042*	0.0071	-0.0053
	(0.0084)	(0.0080)	(0.0050)	(0.0040)

	All races, bachelor's degrees, public four year	All races, bachelor's degrees, private four year	All races, associate's degrees, public two year	All races, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0235***	-0.0451***	0.0157***	-0.0028
	(0.0044)	(0.0007)	(0.0021)	(0.0017)
In-state Tuition and Fees	0.0454	0.0317	0.2078	0.1412
	(0.1977)	(0.1224)	(0.1480)	(0.1192)
Out-of-state Tuition and Fees	-0.0854	-0.0930	-0.1285	-0.4617***
	(0.1692)	(0.1234)	(0.1480)	(0.1192)
State Characteristics				
Per capita Income	-0.2797	0.6270*	-1.2919***	-0.4129*
	(0.4157)	(0.1502)	(0.2304)	(0.1855)
State unemployment rate	-0.1284	-0.1662	0.1024	-0.0401
	(0.2802)	(0.1843)	(0.1048)	(0.1029)
Percent of state age 25 or older with bachelor's degree	-0.0326	0.0414	0.0191	0.0480
	(0.0486)	(0.0655)	(0.0527)	(0.0793)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Constant	2.3486	-2.1758	13.2701***	6.5587***
	(4.5195)	(2.2938)	(2.4657)	(1.9860)
Observations	693	1,390	1,016	1,016
R-squared	0.6628	0.8083	0.1752	0.3873

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

Similar to results for Title V funding and HSIs, patterns emerge when results are disaggregated based on race and ethnicity. Asian American and Pacific Islander, Black, and American Indian and Alaska Native are the primary targets of the majority of Title III-funded MSI programs. Yet as shown in Title V and HSI results, all racial and ethnic categories in institutions receiving Title III MSI funding had higher amounts of completion when compared to those institutions just below the enrollment cutoffs.

Latino/a students appear to have benefitted from Title III MSI funded programs. As presented in Table 24, there was a six percent increase in Latino/a students obtaining bachelor's degrees from private four-year MSIs. There was also a relationship between Title III MSI funding and Latino/a completion of community college credentials. This includes an increase of one percent in associate's degrees and five percent in certificates.

Table 24:

Fuzzy regression discontinuity estimates of the effect of Title III on all Latino/a completers by credential and sector

	Latino/a, bachelor's degrees, public four year	**Latino/a, bachelor's degrees, private four year**	**Latino/a, associate's degrees, public two year**	**Latino/a, certificates, public two year**
MSI/Treatment	0.9801	0.0867*	0.0378*	0.0467***
	(0.6688)	(0.0093)	(0.0096)	(0.0018)
Minority Enrollment	-6.2699***	-6.336***	-7.9281*	-4.1781***
	(0.4025)	(0.4451)	(3.2423)	(0.1589)
Institutional Finance (per $1,000)				
Tuition and Fees	0.1039	0.9440	0.5662	0.0298
	(0.0927)	(0.8710)	(0.3115)	(0.0549)
Federal Operating Grants	-0.0156	-0.0656	0.0847	0.0508
	(0.0247)	(0.0448)	(0.0581)	(0.0163)
Other Federal Operating Grants	-0.0181	-0.0942	0.2179	-0.0651*
	(0.0306)	(0.0822)	(0.0926)	(0.0278)
State Operating Grants	-0.0247	-0.0489	0.0457	-0.0490**
	(0.0215)	(0.0653)	(0.0468)	(0.0160)
Federal Appropriations	-0.0042	-0.0094	-0.0941	-0.0095
	(0.0230)	(0.0642)	(0.0662)	(0.0256)
State Appropriations	-0.0939***	-0.1226***	-0.1731*	-0.0412*
	(0.0252)	(0.0422)	(0.0836)	(0.0163)
Local Appropriations	-0.0561**	-0.0161	0.4188***	0.1102***
	(0.0216)	(0.0902)	(0.1214)	(0.0091)
Instructional Expenses	-0.0886	-0.0611	0.0359	0.0603
	(0.0837)	(0.0743)	(0.1609)	(0.0614)
Academic Support	0.1728	0.0972	-0.0135	0.0332
	(0.0887)	(0.0475)	(0.0710)	(0.0265)
Total Operating Revenues	0.2168*	0.3021*	-0.2009	-0.1578*
	(0.1057)	(0.2109)	(0.1932)	(0.0758)
Instutional Enrollment				
Total full-time, first time enrollment	0.8525***	0.2864***	0.1735***	0.3023***
	(0.0554)	(0.0423)	(0.0430)	(0.0158)
Percent of part-time students	-2.1803***	-1.8845***	1.0202***	0.5245***
	(0.2801)	(0.1620)	(0.2858)	(0.0744)
Percent of students of color	6.0892***	5.8845***	8.1877*	3.7719***
	(0.3476)	(0.9962)	(3.2634)	(0.1085)
Student Financial Aid				
Pell Grants	-0.2368***	0.5011***	0.8197**	0.1047**
	(0.0546)	(0.0222)	(0.2662)	(0.0392)
State Need-Based Aid	0.0261**	0.0160**	0.0093	-0.0023
	(0.0095)	(0.0018)	(0.0150)	(0.0050)
State Merit-Based Aid	-0.0142*	-0.0101*	-0.0169	-0.0113***
	(0.0070)	(0.0040)	(0.0112)	(0.0030)

	Latino/a, bachelor's degrees, public four year	Latino/a, bachelor's degrees, private four year	Latino/a, associate's degrees, public two year	Latino/a, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0251***	-0.0188***	0.0186***	-0.0019
	(0.0037)	(0.0045)	(0.0052)	(0.0012)
In-state Tuition and Fees	-0.0217	-0.0421	-2.1398*	-0.0189
	(0.1666)	(0.1812)	(0.8497)	(0.0906)
Out-of-state Tuition and Fees	0.1193	0.9932	2.2170*	-0.1502
	(0.1425)	(0.1876)	(0.8845)	(0.0906)
State Characteristics				
Per capita Income	0.8270*	0.1256*	-0.1887	0.1090
	(0.3502)	(0.5430)	(0.4265)	(0.1410)
State unemployment rate	-0.0793	-0.1092	0.0989	-0.0905
	(0.0844)	(0.1266)	(0.1883)	(0.1066)
Percent of state age 25 or older with bachelor's degree	-0.0322	0.0132	0.0244	0.0229
	(0.0428)	(0.0266)	(0.0326)	(0.0312)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Constant	-15.7435***	-0.7417*	-1.8694	-2.1367
	(3.8078)	(0.3420)	(3.9291)	(1.5095)
Observations	693	1,390	1,016	1,016
R-squared	0.7750	0.0744	0.2231	0.3368

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

Increases in completion categories were highest for Asian American and Pacific Islander students in Title III MSIs. As displayed in Table 25, there was a five percent increase in bachelor's degrees from public MSIs, a twelve percent increase in the attainment of private four-year bachelor's degrees, a five percent increase in both associate's degrees and community college certificates.

Table 25:

Fuzzy regression discontinuity estimates of the effect of Title III on all Asian American and Pacific Islander completers by credential and sector

	AAPI, bachelor's degrees, public four year	**AAPI, bachelor's degrees, private four year**	**AAPI, associate's degrees, public two year**	**AAPI, certificates, public two year**
MSI/Treatment	0.0472***	0.0710*	0.0959***	0.0245***
	(0.0090)	(0.0264)	(0.0080)	(0.0082)
Minority Enrollment	-2.1931***	-2.1546**	-0.6237***	-0.3323*
	(0.5767)	(0.7971)	(0.1251)	(0.1281)
Institutional Finance (per $1,000)				
Tuition and Fees	0.3322*	-0.3151*	0.1719***	0.1705***
	(0.1328)	(0.1442)	(0.0432)	(0.0442)
Federal Operating Grants	0.0237	0.0199	0.0211	0.0305*
	(0.0353)	(0.0824)	(0.0128)	(0.0131)
Other Federal Operating Grants	-0.0269	0.1070*	0.0410	0.0219
	(0.0438)	(0.0503)	(0.0219)	(0.0224)
State Operating Grants	-0.0738*	-0.0162	-0.0320*	-0.0276*
	(0.0308)	(0.0236)	(0.0126)	(0.0129)
Federal Appropriations	0.0307	0.0010	0.0118	0.0235
	(0.0330)	(0.0026)	(0.0202)	(0.0206)
State Appropriations	-0.0751*	0.0009	-0.0456***	-0.0386**
	(0.0361)	(0.0062)	(0.0128)	(0.0131)
Local Appropriations	-0.0310	0.0003	0.1280***	0.0648***
	(0.0309)	(0.0044)	(0.0072)	(0.0073)
Instructional Expenses	-0.2907*	0.0932	-0.1656***	-0.0040
	(0.1199)	(0.2260)	(0.0483)	(0.0495)
Academic Support	0.2674*	0.4587	-0.0072	0.0364
	(0.1271)	(0.9880)	(0.0209)	(0.0214)
Total Operating Revenues	0.2517	0.4454	-0.0719	-0.1439*
	(0.1514)	(0.2685)	(0.0597)	(0.0611)
Instutional Enrollment				
Total full-time, first time enrollment	0.9063***	0.4516***	0.1229***	0.1978***
	(0.0795)	(0.0754)	(0.0125)	(0.0128)
Percent of part-time students	-2.2186***	0.1245	0.4356***	0.4010***
	(0.4013)	(0.3060)	(0.0586)	(0.0600)
Percent of students of color	1.6166***	-0.2284	0.1732*	0.2870***
	(0.4981)	(0.8999)	(0.0854)	(0.0874)
Student Financial Aid				
Pell Grants	-0.4783***	-0.1660***	0.0927**	-0.0378
	(0.0783)	(0.0454)	(0.0309)	(0.0316)
State Need-Based Aid	0.0479***	0.0100	0.0074	0.0090*
	(0.0137)	(0.0179)	(0.0039)	(0.0040)
State Merit-Based Aid	-0.0130	-0.0152	-0.0014	-0.0039
	(0.0101)	(0.0115)	(0.0024)	(0.0024)

	AAPI, bachelor's degrees, public four year	AAPI, bachelor's degrees, private four year	AAPI, associate's degrees, public two year	AAPI, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0237***	-0.0141***	0.0033***	-0.0012
	(0.0053)	(0.0041)	(0.0010)	(0.0010)
In-state Tuition and Fees	-0.1231	0.4008	-0.3414***	-0.3002***
	(0.2387)	(3.7876)	(0.0713)	(0.0730)
Out-of-state Tuition and Fees	0.0897	-0.3639	0.3211***	0.2037**
	(0.2042)	(3.7840)	(0.0714)	(0.0730)
State Characteristics				
Per capita Income	0.4826	1.2768*	0.3805***	0.6891***
	(0.5018)	(0.5326)	(0.1111)	(0.1137)
State unemployment rate	-0.0799	-0.1098	0.0988	-0.0502
	(0.0894)	(0.1265)	(0.1480)	(0.1078)
Percent of state age 25 or older with bachelor's degree	-0.0999	0.0114	0.0110	0.0521
	(0.0924)	(0.0200)		(0.0926)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Constant	-10.8695*	-17.1118**	-4.8137***	-7.9332***
	(5.4561)	(6.0371)	(1.1891)	(1.2171)
Observations	693	1,390	1,016	1,016
R-squared	0.5222	0.0744	0.0509	0.1572

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

Table 26 displays the results of American Indian and Alaska Native completion in Title III MSI institutions. While there was not evidence of an impact on baccalaureate degrees in either public or private MSIs, there was an increase in associate's degrees (eight percent) and community college certificates (four percent).

Table 26:

Fuzzy regression discontinuity estimates of the effect of Title III on all American Indian and Alaska Native completers by credential and sector

	AIAN, bachelor's degrees, public four year	**AIAN, bachelor's degrees, private four year**	**AIAN, associate's degrees, public two year**	**AIAN, certificates, public two year**
MSI/Treatment	-0.7348	0.1364	0.0376***	0.0674**
	(0.0561)	(1.4855)	(0.0006)	(0.0034)
Minority Enrollment	0.2511	-0.0756	-0.9169***	-0.6002**
	(0.0945)	(0.2249)	(0.2595)	(0.2090)
Institutional Finance (per $1,000)				
Tuition and Fees	0.2511**	-0.0382	-0.1078	-0.1195
	(0.0945)	(0.0407)	(0.0897)	(0.0722)
Federal Operating Grants	-0.0193	0.0044	0.0501	0.0426*
	(0.0251)	(0.0124)	(0.0266)	(0.0214)
Other Federal Operating Grants	0.0708*	-0.0017	-0.0789	-0.0383
	(0.0312)	(0.0141)	(0.0455)	(0.0366)
State Operating Grants	0.0007	-0.0193**	-0.0991***	-0.0462*
	(0.0219)	(0.0066)	(0.0262)	(0.0211)
Federal Appropriations	0.0160	0.0088	0.0207	-0.0441
	(0.0235)	(0.0092)	(0.0419)	(0.0337)
State Appropriations	-0.1427***	0.0155	-0.0199	-0.0106
	(0.0257)	(0.0189)	(0.0266)	(0.0214)
Local Appropriations	-0.0224	0.0042	0.2044***	0.1626***
	(0.0220)	(0.0098)	(0.0149)	(0.0120)
Instructional Expenses	-0.0368	0.0544	0.0401	0.1728*
	(0.0853)	(0.0637)	(0.0236)	(0.0808)
Academic Support	-0.0771	0.0455	0.0108	-0.0417
	(0.0904)	(0.0789)	(0.0433)	(0.0349)
Total Operating Revenues	0.0676	0.0224	0.0457	-0.2882**
	(0.1078)	(0.0757)	(0.1239)	(0.0997)
Instutional Enrollment				
Total full-time, first time enrollment	0.3743***	0.2067***	0.1958***	-0.0682***
	(0.0565)	(0.0212)	(0.0259)	(0.0190)
Percent of part-time students	-0.6602*	0.3014***	1.5155***	0.9092***
	(0.2855)	(0.0863)	(0.1216)	(0.0979)
Percent of students of color	0.0740	-0.0622	0.2157	0.4642**
	(0.3544)	(0.2539)	(0.1772)	(0.1427)
Student Financial Aid				
Pell Grants	-0.0803	0.0124	0.5589***	0.4389***
	(0.0557)	(0.0128)	(0.0641)	(0.0516)
State Need-Based Aid	0.0204*	-0.0001	-0.0113	-0.0108
	(0.0097)	(0.0050)	(0.0082)	(0.0066)
State Merit-Based Aid	-0.0341***	-0.0152***	0.0071	-0.0053
	(0.0072)	(0.0032)	(0.0050)	(0.0040)

	AIAN, bachelor's degrees, public four year	AIAN, bachelor's degrees, private four year	AIAN, associate's degrees, public two year	AIAN, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0143***	-0.0035**	0.0157***	-0.0028
	(0.0038)	(0.0011)	(0.0021)	(0.0017)
In-state Tuition and Fees	-0.2387	-5.7698***	0.2078	0.1412
	(0.1698)	(1.0688)	(0.1480)	(0.1192)
Out-of-state Tuition and Fees	-0.0255	5.7505***	-0.1285	-0.4617***
	(0.1453)	(1.0678)	(0.1480)	(0.1192)
State Characteristics				
Per capita Income	-1.0889**	-0.1221	-1.2919***	-0.4129*
	(0.3571)	(0.1503)	(0.2304)	(0.1855)
State unemployment rate	-0.0990	-0.1094	0.0665	-0.0452
	(0.0721)	(0.1269)	(0.1460)	(0.1072)
Percent of state age 25 or older with bachelor's degree	-0.0669	0.0450	0.0367	0.0511
	(0.0800)	(0.0998)	(0.0615)	(0.0427)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Constant	12.0947**	0.4744	13.2701***	6.5587***
	(3.8824)	(1.7036)	(2.4657)	(1.9860)
Observations	693	1,390	1,016	1,016
R-squared	0.3470	0.2645	0.1752	0.3873

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

As more PBIs tend to be community colleges, it follows that increases in Black student completion occurred in two-year MSIs. Columns 4 and 5 in Table 27 present the results for associate's degrees and certificates, with an increase of eight and four percent respectively. The largest increase was in private four-year baccalaureate degrees at eleven percent. There was not a statistically significant relationship between Title III MSI funding and Black student completion of bachelor's degrees in public institutions.

Table 27:

Fuzzy regression discontinuity estimates of the effect of Title III on all Black and African American completers by credential and sector

	Black, bachelor's degrees, public four year	**Black,, bachelor's degrees, private four year**	**Black, associate's degrees, public two year**	**Black, certificates, public two year**
MSI/Treatment	0.9942	0.0737*	0.0376***	3.6749
	(0.7821)	(0.0071)	(0.0007)	(1.3404)
Minority Enrollment	3.1889***	1.4461*	-0.9169***	-0.6002**
	(0.4706)	(0.7174)	(0.2595)	(0.2090)
Institutional Finance (per $1,000)				
Tuition and Fees	0.3275**	-0.0315	-0.1078	-0.1195
	(0.1084)	(0.1298)	(0.0897)	(0.0722)
Federal Operating Grants	-0.0555	0.0610	0.0501	0.0426*
	(0.0288)	(0.0854)	(0.0266)	(0.0214)
Other Federal Operating Grants	-0.0088	0.1300**	-0.0789	-0.0383
	(0.0357)	(0.0452)	(0.0455)	(0.0366)
State Operating Grants	0.0564*	0.0514*	-0.0991***	-0.0462*
	(0.0251)	(0.0212)	(0.0262)	(0.0211)
Federal Appropriations	-0.0147	0.0199	0.0207	-0.0441
	(0.0270)	(0.0146)	(0.0419)	(0.0337)
State Appropriations	0.0841**	0.0022	-0.0199	-0.0106
	(0.0294)	(0.0032)	(0.0266)	(0.0214)
Local Appropriations	-0.0887***	0.0061	0.2044***	0.1626***
	(0.0252)	(0.0100)	(0.0149)	(0.0120)
Instructional Expenses	-0.2039*	-0.1107	-0.4054***	0.1728*
	(0.0978)	(0.2034)	(0.1003)	(0.0808)
Academic Support	-0.0176	0.0201	0.0108	-0.0417
	(0.1037)	(0.0199)	(0.0433)	(0.0349)
Total Operating Revenues	0.1011	0.1999	0.0457	-0.2882*
	(0.1236)	(0.2416)	(0.1239)	(0.0997)
Instutional Enrollment				
Total full-time, first time enrollment	0.7682***	0.5451***	0.1958***	0.3419***
	(0.0648)	(0.0678)	(0.0259)	(0.0209)
Percent of part-time students	-2.2488***	0.3195	1.5155***	0.9092***
	(0.3275)	(0.2754)	(0.1216)	(0.0979)
Percent of students of color	0.6499	-0.6409	0.2157	0.4642***
	(0.4065)	(0.8099)	(0.1772)	(0.1427)
Student Financial Aid				
Pell Grants	0.2602***	-0.0457	0.5589***	0.4389***
	(0.0639)	(0.0409)	(0.0641)	(0.0516)
State Need-Based Aid	0.0488***	-0.0130	-0.0113	-0.0108
	(0.0112)	(0.0161)	(0.0082)	(0.0066)
State Merit-Based Aid	0.0258**	0.0208*	0.0071	-0.0053
	(0.0082)	(0.0103)	(0.0050)	(0.0040)

	Black, bachelor's degrees, public four year	Black,, bachelor's degrees, private four year	Black, associate's degrees, public two year	Black, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0365***	-0.0116**	0.0157***	-0.0028
	(0.0043)	(0.0037)	(0.0021)	(0.0017)
In-state Tuition and Fees	-0.0783	4.6229	0.2078	0.1412
	(0.1948)	(3.4088)	(0.1480)	(0.1192)
Out-of-state Tuition and Fees	-0.2885	-4.6105	-0.1285	-0.4617***
	(0.1667)	(3.4056)	(0.1480)	(0.1192)
State Characteristics				
Per capita Income	-1.0622*	-0.6729	-1.2919***	-0.4129*
	(0.4095)	(0.4793)	(0.2304)	(0.1855)
State unemployment rate	-0.1200	-0.1281	0.1188	-0.0702
	(0.1291)	(0.1266)	(0.1989)	(0.0991)
Percent of state age 25 or older with bachelor's degree	-0.0758	0.0822	0.0252	0.0528
	(0.0743)	(0.0942)	(0.0506)	(0.0504)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Constant	10.8533*	4.7016	13.2701***	6.5587***
	(4.4527)	(5.4334)	(2.4657)	(1.9860)
Observations	693	1,390	1,016	1,016
R-squared	0.6568	0.0744	0.1752	0.3873

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

Though MSI programs focus on advancing success for students of color, White students also benefit from such programs. In Title III MSIs, White students increased completion of credentials and degrees in all categories. Table 28 displays these results. White student completion was highest in private four-year institutions (ten percent) and associate's degrees (eight percent).

Table 28:

Fuzzy regression discontinuity estimates of the effect of Title III on all White, non-Hispanic completers by credential and sector

	White, bachelor's degrees, public four year	White, bachelor's degrees, private four year	White, associate's degrees, public two year	White, certificates, public two year
MSI/Treatment	0.0862*	0.0988*	0.0376***	0.0674**
	(0.0189)	(0.0438)	(0.0006)	(0.0034)
Minority Enrollment	-2.4737***	-2.1782***	-0.9169***	-0.6002**
	(0.5168)	(0.6720)	(0.2595)	(0.2090)
Institutional Finance (per $1,000)				
Tuition and Fees	0.2452*	-0.0428	-0.1078	-0.1195
	(0.1190)	(0.1216)	(0.0897)	(0.0722)
Federal Operating Grants	0.0196	0.0100	0.0501	0.0426*
	(0.0317)	(0.0221)	(0.0266)	(0.0214)
Other Federal Operating Grants	-0.0108	0.0696	-0.0789	-0.0383
	(0.0393)	(0.0424)	(0.0455)	(0.0366)
State Operating Grants	-0.0585*	0.0262	-0.0991***	-0.0462*
	(0.0276)	(0.0199)	(0.0262)	(0.0211)
Federal Appropriations	0.0234	0.0099	0.0207	-0.0441
	(0.0296)	(0.0126)	(0.0419)	(0.0337)
State Appropriations	-0.0748*	0.0126	-0.0199	-0.0106
	(0.0323)	(0.0299)	(0.0266)	(0.0214)
Local Appropriations	-0.0900***	0.1012	0.2044***	0.1626***
	(0.0277)	(0.1089)	(0.0149)	(0.0120)
Instructional Expenses	-0.2969**	-0.1440	-0.4054***	0.1728*
	(0.1074)	(0.1905)	(0.1003)	(0.0808)
Academic Support	-0.0001	0.0202	0.0108	-0.0417
	(0.1139)	(0.0444)	(0.0433)	(0.0349)
Total Operating Revenues	0.2750*	0.3437	0.0457	-0.2882**
	(0.1357)	(0.2263)	(0.1239)	(0.0997)
Instutional Enrollment				
Total full-time, first time enrollment	0.7025***	0.7078***	0.1958***	0.3419***
	(0.0712)	(0.0635)	(0.0259)	(0.0209)
Percent of part-time students	-3.4019***	0.5336*	1.5155***	0.9092***
	(0.3597)	(0.2580)	(0.1216)	(0.0979)
Percent of students of color	-1.4232***	-3.4673***	0.2157	0.4642***
	(0.4464)	(0.7587)	(0.1772)	(0.1427)
Student Financial Aid				
Pell Grants	-0.1043	-0.0252	0.5589***	0.4389***
	(0.0702)	(0.0383)	(0.0641)	(0.0516)
State Need-Based Aid	0.0300*	0.0044	-0.0113	-0.0108
	(0.0123)	(0.0151)	(0.0082)	(0.0066)
State Merit-Based Aid	-0.0008	-0.0073	0.0071	-0.0053
	(0.0091)	(0.0097)	(0.0050)	(0.0040)

	White, bachelor's degrees, public four year	White, bachelor's degrees, private four year	White, associate's degrees, public two year	White, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0255***	-0.0069*	0.0157***	-0.0028
	(0.0048)	(0.0035)	(0.0021)	(0.0017)
In-state Tuition and Fees	0.0036	-2.6966	0.2078	0.1412
	(0.2139)	(3.1931)	(0.1480)	(0.1192)
Out-of-state Tuition and Fees	-0.1395	2.8723	-0.1285	-0.4617***
	(0.1830)	(3.1901)	(0.1480)	(0.1192)
State Characteristics				
Per capita Income	-0.7919	-0.7943	-1.2919***	-0.4129*
	(0.4498)	(0.4490)	(0.2304)	(0.1855)
State unemployment rate	-0.0978	-0.1192	0.0884	-0.0992
	(0.0614)	(0.1263)	(0.1882)	(0.1144)
Percent of state age 25 or older with bachelor's degree	-0.0120	0.0204	0.0141	0.0483
	(0.0369)	(0.0888)	(0.0495)	(0.0717)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Constant	9.4948	5.1324	13.2701	6.5587***
	(4.8899)	(5.0896)	(2.4657)	(1.9860)
Observations	693	1,390	1,016	1,016
R-squared	0.6450	0.1830	0.1752	0.3873

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

As seen in the results for Title V funding and HSIs, there was also a relationship between Title III MSI funding and completion measures for non-resident alien students. The rate of change was mostly lower than other racial and ethnic categories. For example, non-resident alien students saw an increase of two percent in public four-year bachelor's degrees for Title III-funding MSIs as seen in Table 29. Columns 4 and 5 show that these students experienced an increase of one percent in both associate's degrees and community college certificates.

Table 29:

Fuzzy regression discontinuity estimates of the effect of Title III on all Non-resident Student Alien completers by credential and sector

	NRA, bachelor's degrees, public four year	**NRA, bachelor's degrees, private four year**	**NRA, associate's degrees, public two year**	**NRA, certificates, public two year**
MSI/Treatment	0.0812*	4.0838	0.0664*	0.0127**
	(0.0235)	(3.0857)	(0.0047)	(0.0040)
Minority Enrollment	-1.1679*	-1.0151*	-0.1020	-0.1664**
	(0.5010)	(0.4672)	(0.0734)	(0.0627)
Institutional Finance (per $1,000)				
Tuition and Fees	0.3969***	-0.3679***	0.0891***	0.1225***
	(0.1154)	(0.0845)	(0.0253)	(0.0216)
Federal Operating Grants	0.0234	0.0015	0.0035	0.0076
	(0.0307)	(0.0062)	(0.0075)	(0.0064)
Other Federal Operating Grants	0.0718	0.0532	0.0419***	0.0378***
	(0.0381)	(0.0294)	(0.0128)	(0.0109)
State Operating Grants	-0.0095	-0.0132	-0.0046	-0.0209***
	(0.0268)	(0.0138)	(0.0074)	(0.0063)
Federal Appropriations	0.0327	0.0441	-0.0248*	0.0039
	(0.0287)	(0.0587)	(0.0118)	(0.0101)
State Appropriations	-0.0166	-0.0960	-0.0169*	-0.0368***
	(0.0313)	(0.1055)	(0.0075)	(0.0064)
Local Appropriations	0.0194	0.0194	0.0748***	0.0336***
	(0.0268)	(0.0268)	(0.0042)	(0.0036)
Instructional Expenses	-0.2657*	0.2361	-0.0710*	-0.0094
	(0.1041)	(0.1325)	(0.0283)	(0.0057)
Academic Support	0.0332	0.0062	0.0057	0.0169
	(0.1104)	(0.0126)	(0.0122)	(0.0104)
Total Operating Revenues	0.0863	0.3527*	-0.0939**	-0.1001***
	(0.1316)	(0.1573)	(0.0350)	(0.0299)
Instutional Enrollment				
Total full-time, first time enrollment	0.7851***	0.5253***	0.0573***	0.0507***
	(0.0690)	(0.0442)	(0.0073)	(0.0062)
Percent of part-time students	-2.6539***	-0.3918*	0.1733***	0.1303***
	(0.3486)	(0.1793)	(0.0344)	(0.0293)
Percent of students of color	0.8433	-0.1249	0.0024	0.0661
	(0.4327)	(0.5275)	(0.0501)	(0.0428)
Student Financial Aid				
Pell Grants	-0.2733***	-0.1466***	0.0903***	-0.0052
	(0.0680)	(0.0266)	(0.0181)	(0.0154)
State Need-Based Aid	0.0430***	0.0018	0.0009	0.0034
	(0.0119)	(0.0105)	(0.0023)	(0.0019)
State Merit-Based Aid	-0.0032	0.0008	0.0001	0.0007
	(0.0088)	(0.0067)	(0.0014)	(0.0012)

	NRA, bachelor's degrees, public four year	NRA, bachelor's degrees, private four year	NRA, associate's degrees, public two year	NRA, certificates, public two year
Institutional Characteristics				
Selectivity	-0.0275***	-0.0079***	0.0035***	-0.0002
	(0.0046)	(0.0024)	(0.0005)	(0.0005)
In-state Tuition and Fees	0.0022	2.5831	-0.0802	-0.1375***
	(0.2073)	(2.2201)	(0.0418)	(0.0357)
Out-of-state Tuition and Fees	-0.2798	-2.5413	0.0656	0.1243***
	(0.1774)	(2.2180)	(0.0418)	(0.0357)
State Characteristics				
Per capita Income	-0.9159*	0.4714	0.3535***	0.0002
	(0.4360)	(0.3122)	(0.0651)	(0.0556)
State unemployment rate	-0.0794	-0.1091	0.0983	-0.0501
	(0.0812)	(0.1266)	(0.1480)	(0.1072)
Percent of state age 25 or older with bachelor's degree	-0.0811	0.0752	0.0411	0.0722
	(0.0962)	(0.0653)	(0.0718)	(0.0838)
Year fixed effects	Yes	Yes	Yes	Yes
Institution fixed effects	Yes	Yes	Yes	Yes
Constant	7.5770	-8.7078*	-4.1110***	-0.2988
	(4.7400)	(3.5387)	(0.6977)	(0.5960)
Observations	693	1,390	1,016	1,016
R-squared	0.5996	0.3875	0.2898	0.1094

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

Title V: Upward Social Mobility

Based on recent studies assessing upward social mobility across institutional sectors (Chetty et al., 2017), it would be assumed that public institutions might demonstrate a higher propensity for graduating students of color. Chetty et al. (2017) created rankings for upward social mobility. One rankings list featured eight MSIs out of ten institutions or systems that boost the highest number of students from the lowest income quintile to the top 20 percent. Closer inspection reveals the variability in

conducting a quasi-experimental research design employing the Equality of Opportunity Project data. Though Chetty et al. (2017) found that many public four-year institutions advanced upward social mobility, others did not. As these researchers found, there is usually an inverse relationship between institutional selectivity and upward social mobility.

There was evidence of a relationship between Title V funding and upward social mobility in all categories of upward social mobility. These results are shown in tables 30-33. As presented in Table 30, there was a five percent increase in students rising two economic quintiles when controlling for all other factors in public four-year HSIs. There was a three percent increase in students rising two economic quintiles in two-year HSIs, though this was statistically significant only at the 10 percent level.

Table 30:

Fuzzy regression discontinuity estimates of the effect of Title V on upward social mobility, increase by two income quintiles and first to fifth income quintiles

	Increase by two, Public four year	Increase by two, Private four year	Increase by two, Public two year	1 to 5, Public four year	1 to 5, Private four year	1 to 5, Public two year
HSI/Treatment	0.0483*	0.0436	0.0339	0.0308***	0.0399***	0.0206***
	(0.0237)	(0.0301)	(0.0197)	(0.0061)	(0.0079)	(0.0046)
Latino/a Enrollment	0.0321	0.0211	0.0513	-0.0140	-0.0295**	-0.0037
	(0.0347)	(0.0196)	(0.0304)	(0.0089)	(0.0111)	-(0.0037)
Institutional Finance (per $1,000)						
Tuition and Fees	-0.0010	0.0165	-0.0046	0.0018*	0.0001	0.0006
	(0.0032)	(0.0031)	(0.0027)	(0.0008)	(0.0008)	(0.0006)
Federal Operating Grants	0.0003	0.0001	0.0002	-0.0001	-0.0001	-0.0001
	(0.0008)	(0.0008)	(0.0006)	(0.0002)	(0.0002)	(0.0001)
Other Federal Operating Grants	-0.0007	0.0028**	-0.0006	-0.0001	0.0003	-0.0002
	(0.0009)	(0.0010)	(0.0008)	(0.0002)	(0.0002)	(0.0002)
State Operating Grants	0.0016*	0.0001	0.0008	0.0005**	-0.0004***	0.0003**
	(0.0006)	(0.0004)	(0.0005)	(0.0001)	(0.0001)	(0.0001)
Federal Appropriations	0.0005	0.0002	-0.0002	-0.0001	-0.0001	-0.0003
	(0.0007)	(0.0006)	(0.0007)	(0.0002)	(0.0002)	(0.0001)
State Appropriations	0.0021*	0.0012	0.0010	0.0007**	0.0002	0.0004*
	(0.0009)	(0.0012)	(0.0008)	(0.0002)	(0.0002)	(0.0002)
Local Appropriations	-0.0022***	-0.0006	-0.0018***	-0.0003***	-0.0001	-0.0003***
	(0.0003)	(0.0010)	(0.0003)	(0.0001)	(0.0001)	(0.0001)
Instructional Expenses	-0.0101***	-0.0033	-0.0102***	-0.0022***	0.0029*	-0.0021***
	(0.0024)	(0.0045)	(0.0025)	(0.0006)	(0.0012)	(0.0006)
Academic Support	-0.0079***	-0.0090***	-0.0065***	-0.0018***	-0.0014***	-0.0012***
	(0.0017)	(0.0020)	(0.0014)	(0.0004)	(0.0002)	(0.0003)
Total Operating Revenues	-0.0031	-0.0235***	0.0026	-0.0006	-0.0035***	0.0006
	(0.0036)	(0.0038)	(0.0033)	(0.0009)	(0.0009)	(0.0008)
Instutional Enrollment						
Total full-time, first time enrollment	-0.0113***	-0.0071***	-0.0136***	0.0005	0.0007*	0.0001
	(0.0013)	(0.0012)	(0.0013)	(0.0003)	(0.0003)	(0.0045)
Percent of part-time students	-0.0020	-0.0008	-0.0064	-0.009***	-0.0122***	-0.0091***
	(0.0064)	(0.0063)	(0.0057)	(0.0016)	(0.0016)	(0.0013)
Percent of students of color	0.1658***	0.1670***	0.1435	0.0276***	0.0260***	0.0225***
	(0.0060)	(0.0057)	(0.0057)	(0.0015)	(0.0015)	(0.0013)
Student Financial Aid						
Pell Grants	0.0265***	0.0106***	0.0240***	0.0024***	0.0010***	0.0021***
	(0.0022)	(0.0012)	(0.0021)	(0.0005)	(0.0003)	(0.0004)
State Need-Based Aid	-0.0008	-0.0010*	-0.0011*	0.0002	0.0003*	0.0001
	-(0.0008)	(0.0005)	(0.0005)	(0.0001)	(0.0001)	(0.0001)
State Merit-Based Aid	-0.0004**	-0.0004**	-0.0006	0.0001	-0.0001	-0.0015***
	(0.0001)	(0.0001)	(0.0001)	(0.0010)	(0.0031)	(0.0001)
Institutional Characteristics						
Selectivity	0.0002***	0.0001	0.0002*	.0010***	0.0001	0.0009
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0015)	(0.0077)
In-state Tuition and Fees	0.0172***	0.0088**	0.0141***	0.0020**	0.0013	0.0019***
	(0.0029)	(0.0029)	(0.0023)	(0.0007)	(0.0007)	(0.0005)
Out-of-state Tuition and Fees	-0.0153***	-0.0059*	-0.0120***	-0.0018*	-0.0012	-0.0014**
	(0.0029)	(0.0029)	(0.0023)	(0.0007)	(0.0007)	(0.0005)

	Increase by two, Public four year	Increase by two, Private four year	Increase by two, Public two year	1 to 5, Public four year	1 to 5, Private four year	1 to 5, Public two year
State Characteristics						
Per capita Income	0.0154	-0.0073	0.0014	0.0174***	0.0152***	0.0103***
	(0.0154)	(0.0078)	(0.0071)	(0.0021)	(0.0021)	(0.0016)
State unemployment rate	-0.0112	0.0090	-0.0028	-0.0521	-0.1091	0.0983
	(0.0277)	(0.0422)	(0.0773)	(0.0697)	(0.1266)	(0.1480)
Percent of state age 25 or older with bachelor's degree	0.0501	0.0222	0.0664	-0.0301	0.0752	0.0411
	(0.0721)	(0.0678)	(0.1010)	(0.0653)	(0.0653)	(0.0718)
Constant	0.0709	0.2965	0.2554***	-0.1890***	-0.1715***	-0.1033***
	(0.0874)	(0.0886)	(0.0755)	(0.0226)	(0.0234)	(0.0180)
Observations	2519	2894	2805	2519	2894	2805
R-squared	0.5296	0.4788	0.4867	0.2783	0.098	0.2747

*p< .05 **p< .01 ***p< .001.

The greatest distance in upward mobility as measured by Chetty et al. (2017) is rising from the lowest income quintile to the highest. There is a relationship between Title V HSI funding and increasing from lowest to highest income quintiles in all sectors. As seen in Table 31, there was a three percent increase in public four-year HSIs, a four percent increase in private four-year HSIs, and a two percent increase in HSI community colleges. This provides an empirical reinforcement to Chetty et al.'s (2017) ranking of those institutions leading to mobility, which includes eight MSIs.

Table 31:

Fuzzy regression discontinuity estimates of the effect of Title V on upward social mobility, first to fourth and first to third income quintiles

	1 to 4, Public four year	1 to 4, Private four year	1 to 4, Public two year	1 to 3, Public four year	1 to 3, Private four year	1 to 3, Public two year
HSI/Treatment	.0224***	0.0247***	0.0188**	0.0298***	0.0522***	0.0299***
	(0.0056)	(0.0071)	(0.0065)	(0.0077)	(0.0110)	(0.0068)
Latino/a Enrollment	.0630***	0.0613***	0.0557***	0.0471***	0.0720***	0.0465***
	(0.0082)	(0.0100)	(0.0091)	(0.0113)	(0.0154)	(0.0105)
Institutional Finance (per $1,000)						
Tuition and Fees	-0.0012	0.0044***	-0.0009	-0.0092***	0.0039***	-0.0088***
	(0.0007)	(0.0007)	(0.0008)	(0.0010)	(0.0011)	(0.0009)
Federal Operating Grants	0.0004*	0.0005*	0.0008*	0.0007**	0.0004**	0.0009***
	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0001)	(0.0009)
Other Federal Operating Grants	-0.0001	0.0004*	0.0006	0.0001	0.0012***	0.0002
	(0.0002)	(0.0002)	(0.0026)	(0.0003)	(0.0003)	(0.0002)
State Operating Grants	0.0003*	0.0001	0.0002	-0.0007***	-0.0002	-0.0008***
	(0.0001)	(0.0033)	(0.0001)	(0.0002)	(0.0001)	(0.0001)
Federal Appropriations	0.0001	0.0011	0.0001	0.0009	0.0001	0.0007
	(0.0002)	(0.0020)	(0.0002)	(0.0027)	(0.0012)	(0.0018)
State Appropriations	-0.0003	-0.0009	-0.0001	0.0008	0.0003	-0.0008
	(0.0002)	(0.0009)	-(0.0001)	(0.0032)	(0.0021)	(0.0027)
Local Appropriations	-0.0003***	-0.0003***	-0.0003***	0.0001	0.0001	0.0008
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0002)	(0.0011)
Instructional Expenses	-0.0016**	-0.0055***	-0.0014*	-0.0011	-0.0043**	-0.0017
	(0.0005)	(0.0010)	(0.0006)	(0.0008)	(0.0016)	(0.0008)
Academic Support	-0.0006	-0.0008	-0.0005	0.0002	0.0004	0.0008
	(0.0004)	(0.0009)	(0.0004)	(0.0005)	(0.0005)	(0.0004)
Total Operating Revenues	-0.0031***	-0.0014	-0.0032***	0.0005	-0.0025	-0.0011
	(0.0008)	(0.0008)	(0.0010)	(0.0011)	(0.0013)	(0.0011)
Instutional Enrollment						
Total full-time, first time enrollment	-0.0038***	-0.0024***	-0.0036***	-0.0072***	-0.0011***	-0.0085***
	(0.0003)	(0.0002)	(0.0003)	(0.0004)	(0.0004)	(0.0004)
Percent of part-time students	0.0042**	0.0081***	0.0056***	0.0102***	0.0214***	0.0126***
	(0.0015)	(0.0015)	(0.0016)	(0.0021)	(0.0023)	(0.0020)
Percent of students of color	0.0381***	0.0396***	0.0370***	0.0530***	0.0617	0.0556***
	(0.0014)	(0.0013)	(0.0016)	(0.0019)	(0.0020)	(0.0019)
Student Financial Aid						
Pell Grants	0.0087***	0.0019***	0.0081***	0.0126***	0.0014***	0.0144***
	(0.0005)	(0.0002)	(0.0006)	(0.0007)	(0.0004)	(0.0144)
State Need-Based Aid	-0.0002*	-0.0001	-0.0001	-0.0003*	-0.0003	-0.0005***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
State Merit-Based Aid	0.0003	0.0009	0.0009	0.0002***	0.0002***	0.0002***
	(0.0042)	(0.0088)	(0.0032)	(0.0001)	(0.0001)	(0.0001)
Institutional Characteristics						
Selectivity	.0006**	0.0021***	0.0011***	0.0017	0.0015***	0.0001
	(0.0002)	(0.0001)	(0.0001)	(0.0041)	(0.0003)	(0.0048)
In-state Tuition and Fees	0.0030***	0.0004	0.0022**	0.0026**	-0.0003	.0018*
	(0.0006)	(0.0006)	(0.0007)	(0.0009)	(0.0010)	(0.0008)
Out-of-state Tuition and Fees	-0.0025***	0.0001	-0.0020**	-0.0041***	-0.0001	-0.0029***
	(0.0006)	(0.0006)	(0.0007)	(0.0009)	(0.0010)	(0.0007)

	1 to 4, Public four year	1 to 4, Private four year	1 to 4, Public two year	1 to 3, Public four year	1 to 3, Private four year	1 to 3, Public two year
State Characteristics						
Per capita Income	-0.0079***	-0.0139***	-0.0083***	-0.0217***	-0.0328***	-0.0176***
	(0.0019)	(0.0018)	(0.0020)	(0.0026)	(0.0028)	(0.0024)
State unemployment rate	0.0032	-0.0462	-0.1266	-0.0702	-0.0978	-0.1200
	(0.0010)	(0.0511)	(0.1410)	(0.0991)	(0.0614)	(0.1291)
Percent of state age 25 or older with bachelor's degree	0.0981	-0.0669	0.0667	0.0528	-0.0120	-0.0758
	(0.1212)	(0.0800)	(0.0895)	(0.0504)	(0.0369)	(0.0743)
Constant	0.1493	0.2054***	0.1499***	0.327***	0.4462***	0.2951***
	(0.0205)	(0.0211)	(0.0223)	(0.0286)	(0.0324)	(0.0262)
Observations	2519	2894	2805	2519	2894	2805
R-squared	0.6104	0.5439	0.5811	0.6524	0.5447	0.6588

*p< .05 **p< .01 ***p< .001.

Several other categories of mobility as measured by income quintile distance demonstrated a statistically significant relationship between Title V funding and upward mobility. First to third quintile, second to fifth, and third to fifth demonstrated a statistically significant relationship in all sectors. As show in Tables 31-33, increases ranged form two to five percent. For example, there was an increase of three percent in those rising from second to fifth in four-year public HSIs and five percent in four-year private HSIs. Third to fifth also displayed similar levels of increases in all sectors, as shown in Table 33: four percent in public four-year and three percent in both private four-year HSIs and two-year HSIs. The second to fourth category was the only one to feature no statistically significant relationship between Title V HSI funding and upward mobility in any sector.

Table 32:

Fuzzy regression discontinuity estimates of the effect of Title V on upward social mobility, second to fourth and second to fifth income quintiles

	2 to 4, Public four year	2 to 4, Private four year	2 to 4, Public two year	2 to 5, Public four year	2 to 5, Private four year	2 to 5, Public two year
HSI/Treatment	-0.0002	-0.0001	0.0050	0.0339***	0.0453***	0.0259***
	(0.0064)	(0.0080)	(0.0054)	(0.0072)	(0.0096)	(0.0057)
Latino/a Enrollment	0.0104	0.0095	0.0051	-0.02878**	-0.0461***	-0.0188*
	(0.0095)	(0.0113)	(0.0055)	(0.0105)	(0.0135)	(0.0087)
Institutional Finance (per $1,000)						
Tuition and Fees	0.0027**	0.0053***	0.0031***	0.0105**	0.0008	0.0011
	(0.0009)	(0.0008)	(0.0008)	(0.0009)	(0.0009)	(0.0007)
Federal Operating Grants	-0.0001	0.0004	0.0001	-0.0002	-0.0001	-0.0004*
	(0.0002)	(0.0004)	(0.0002)	(0.0003)	(0.0003)	(0.0002)
Other Federal Operating Grants	0.0001	0.0004	0.0003	-0.0002	0.0003	-0.0003
	(0.0003)	(0.0002)	(0.0021)	(0.0003)	(0.0003)	(0.0002)
State Operating Grants	0.0007***	0.0003*	0.0004**	0.0005*	0.0005	0.0003*
	(0.0002)	(0.0001)	(0.0002)	(0.0002)	(0.0015)	(0.0002)
Federal Appropriations	-0.0001	0.0002	0.0002	0.0001	0.0002	-0.0001
	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
State Appropriations	0.0006	0.0001	0.0001	0.0007*	0.0002	0.0004
	(0.0022)	(0.0004)	(0.0003)	(0.0003)	(0.0003)	(0.0002)
Local Appropriations	-0.0005***	-0.0002	-0.0004***	-0.0005***	-0.0001	-0.0004***
	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Instructional Expenses	-0.0014*	-0.0083***	-0.0017*	-0.0016*	0.0032*	-0.0015*
	(0.0007)	(0.0012)	(0.0007)	(0.0007)	(0.0015)	(0.0007)
Academic Support	-0.0010*	-0.0018	-0.0013	-0.0026***	-0.0012	-0.0022***
	(0.0005)	(0.0005)	(0.0004)	(0.0005)	(0.0009)	(0.0004)
Total Operating Revenues	-0.0053***	-0.0014	-0.0038***	0.0009	-0.0048***	0.0032***
	(0.0010)	(0.0010)	(0.0009)	(0.0011)	(0.0012)	(0.0010)
Instutional Enrollment						
Total full-time, first time enrollment	-0.0049***	-0.0034***	-0.0047	0.0011**	0.0014***	0.0010*
	(0.0004)	(0.0003)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Percent of part-time students	0.0113***	0.0119***	0.0102***	-0.0091***	-0.0141***	-0.0118***
	(0.0018)	(0.0017)	(0.0016)	(0.0020)	(0.0020)	(0.0017)
Percent of students of color	0.0319***	0.0300***	0.0251***	0.0226***	0.0203***	0.0164***
	(0.0016)	(0.0015)	(0.0016)	(0.0018)	(0.0018)	(0.0017)
Student Financial Aid						
Pell Grants	0.0071***	0.0042***	0.0052***	-0.0002	0.0013***	-0.0010
	(0.0006)	(0.0003)	(0.0006)	(0.0006)	(0.0004)	(0.0005)
State Need-Based Aid	-0.0003*	-0.0004**	-0.0003***	-0.0001	-0.0002	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
State Merit-Based Aid	0.0001	0.0004	0.0001	-0.0002***	-0.0002***	-0.0002***
	(0.0040)	(0.0040)	(0.0013)	(0.0001)	(0.0001)	(0.0001)
Institutional Characteristics						
Selectivity	0.0005*	0.0003	0.0010*	.0005*	-0.0003	0.0003
	(0.0001)	(0.0040)	(0.0001)	(0.0003)	(0.0027)	(0.0024)
In-state Tuition and Fees	0.0003*	0.0028***	0.0017**	0.0034***	0.0028**	0.0031***
	(0.0001)	(0.0001)	(0.0007)	(0.0009)	(0.0009)	(0.0007)
Out-of-state Tuition and Fees	-0.0023**	-0.0018*	-0.0015*	-0.0027**	-0.0022*	-0.0023***
	(0.0008)	(0.0008)	(0.0006)	(0.0009)	(0.0009)	(0.0007)

	2 to 4, Public four year	2 to 4, Private four year	2 to 4, Public two year	2 to 5, Public four year	2 to 5, Private four year	2 to 5, Public two year
State Characteristics						
Per capita Income	-0.0108***	-0.0128***	-0.0098***	0.0209***	0.0201***	0.0132***
	(0.0022)	(0.0021)	(0.0020)	(0.0025)	(0.0025)	(0.0020)
State unemployment rate	0.1188	-0.1182	-0.0112	-0.0089	0.0843	-0.0428
	(0.1989)	(0.1244)	(0.0216)	(0.0456)	(0.1243)	(0.0894)
Percent of state age 25 or older with bachelor's degree	0.0252	-0.0212	-0.0226	0.0123	0.0098	0.0287
	(0.0506)	(0.0388)	(0.0444)	(0.0278)	(0.0142)	(0.0639)
Constant	0.1785***	0.1946***	0.1689***	-0.2164***	-0.2121***	-0.1266***
	(0.0238)	(0.0236)	(0.0210)	(0.0266)	(0.0282)	(0.0217)
Observations	2519	2,894	2805	2519	2894	2805
R-squared	0.4208	0.4548	0.3428	0.1414	0.4848	0.1477

*p< .05 **p< .01 ***p< .001.

Table 33:

Fuzzy regression discontinuity estimates of the effect of Title V on upward social mobility, third to fifth income quintiles

	3 to 5, Public four year	3 to 5, Public private year	3 to 5, Public two year
HSI/Treatment	0.0360***	0.0312**	0.0268***
	(0.0088)	(0.0104)	(0.0071)
Latino/a Enrollment	-0.0455***	-0.0378**	-0.0330**
	(0.0129)	(0.0147)	(0.0110)
Institutional Finance (per $1,000)			
Tuition and Fees	0.0022	0.0019	0.0006
	(0.0011)	(0.0015)	(0.0098)
Federal Operating Grants	-0.0003	-0.0002	-0.0006**
	(0.0003)	(0.0003)	(0.0002)
Other Federal Operating Grants	-0.0005	0.0001	-0.0003
	(0.0003)	(0.0004)	(0.0003)
State Operating Grants	0.0003	0.0007**	0.0004*
	(0.0002)	(0.0002)	(0.0002)
Federal Appropriations	0.0005	0.0004	0.0002
	(0.0002)	(0.0004)	(0.0002)
State Appropriations	0.0006	0.0006	0.0001
	(0.0003)	(0.0003)	(0.0003)
Local Appropriations	-0.0006***	-0.0002	-0.0005
	(0.0002)	(0.0002)	(0.0001)
Instructional Expenses	-0.0022*	0.0093***	-0.0013
	(0.0009)	(0.0023)	(0.0009)
Academic Support	-0.0021***	-0.0012	-0.0021***
	(0.0006)	(0.0010)	(0.0005)
Total Operating Revenues	0.0045***	-0.0104***	0.0070***
	(0.0014)	(0.0019)	(0.0012)
Instutional Enrollment			
Total full-time, first time enrollment	0.0029***	0.0030***	0.0029***
	(0.0005)	(0.0005)	(0.0005)
Percent of part-time students	-0.0097***	-0.0186***	-0.0125***
	(0.0024)	(0.0026)	(0.0021)
Percent of students of color	-0.0076***	-0.0133***	-0.0114***
	(0.0022)	(0.0024)	(0.0021)
Student Financial Aid			
Pell Grants	-0.0041***	0.0005	-0.0048***
	(0.0008)	(0.0005)	(0.0008)
State Need-Based Aid	-0.0005	-0.0004*	-0.0001
	(0.0020)	(0.0002)	(0.0001)
State Merit-Based Aid	-0.0047***	-0.0005	-0.0051***
	(0.0005)	(0.0001)	(0.0005)

	3 to 5, Public four year	3 to 5, Public private year	3 to 5, Public two year
Institutional Characteristics			
Selectivity	0.0001	-0.0009***	0.0004
	(0.0035)	(0.0002)	(0.0031)
In-state Tuition and Fees	0.0032**	0.0014	0.0038***
	(0.0011)	(0.0010)	(0.0009)
Out-of-state Tuition and Fees	-0.0018	-0.0003	-0.0023**
	(0.0010)	(0.0010)	(0.0008)
State Characteristics			
Per capita Income	0.0176***	0.0183***	0.0104
	(0.0030)	(0.0034)	(0.0026)
State unemployment rate	-0.0026	-0.0672	0.0098
	(0.0142)	(0.0944)	(0.0419)
Percent of state age 25 or older with bachelor's degree	-0.0188	0.0078	0.0122
	(0.0248)	(0.0142)	(0.0652)
Constant	-0.1785***	-0.1747***	-0.0965***
	(0.0325)	(0.0371)	(0.0272)
Observations	2519	2104	2805
R-squared	0.1897	0.2157	0.2554

*p< .05 **p< .01 ***p< .001.

CHAPTER 5: DISCUSSION AND CONCLUSION

This study finds evidence of a causal link between an institution receiving funding as an MSI and increasing college completion measures. It also demonstrates a causal relationship between Title V funding and upward social mobility in HSIs. These findings are modest in the magnitude of impact. While this study can answer these quantitative questions, it cannot answer the qualitative questions related to why MSIs appear to advance college completion and upward mobility. This study cannot delve deeper than whether or not an institution receives Title V or Title III funding. It does not explore how that funding is used. That is an area of study critical to better understanding how MSIs are performing this important function.

Most would argue that the common goal of college is to graduate students. For at least the past decade, college completion has become a priority in public policy for higher education in addition to popular media accounts of higher education (Perna & Finney, 2014; Zumeta, Breneman, Callan, & Finney, 2012). Considering the ongoing public narrative that emphasizes college completion, it is not a surprise that MSIs tend to include degree attainment and student retention as primary outcomes for their federally funded programs. Advocacy organizations continue to push for policymakers to emphasize the importance of increasing the number of postsecondary certificate or degree holders. Extensive research has demonstrated how this has influenced policymakers throughout the U.S. at both the state and federal levels (McLendon, Hearn and Mokher, 2009; Tandberg & Griffith, 2013). A popular state finance approach to incentivizing institutions to increase the number of college completers is performance-based funding

(Dougherty & Natow, 2015). Empirical research mostly finds a null or negative impact of pay-for-performance as it has thus far been implemented towards higher education (Kelchen & Stedrak, 2016). Yet MSIs are especially vulnerable to such accountability policies that tend to penalize institutions enrolling a larger share of academically underprepared and lower-income students (Boland, 2015; Jones, 2014; Jones, 2016). Given the current context of prioritized college completion and increased tenor of accountability, it stands to reason MSIs will continue to focus on completion and retention in all sectors and levels of higher education. 72 percent of all Title V and Title III project abstracts suggest measures of college completion (associate's and bachelor's degrees or graduation rates) as programmatic goals (Boland, 2018).

A critical consideration when assessing the efficacy of public policies related to higher education degree attainment and upward social mobility is how well such policies further equity. As explored in Chapter 2, the research into the relationship between public policies and higher education completion measures varies wildly in terms of empirical findings. Many argue that most public policies for postsecondary education lead to unintended consequences that negatively affect students, such as the complex array of federal financial aid programs. While the research on these forms of aid are mixed in how they affect student success, this study finds evidence of a positive relationship between federal grants to institutions with the purpose of assisting students of color. It also finds that these institutions benefit all students in some measures, including White students. In sum, Title III and Title V MSI grant programs appear to advance equity.

Though most MSIs highlight measurable outcomes such as graduation rates and workforce training, many also emphasize not as easily quantifiable goals including community and culture. These have been hallmarks of MSIs and are often seen as the secret to how these institutions have been able to graduate a higher number of students of color. Infusing programs that prioritize student success through connections to community and incorporation of culture can lead towards increased quantifiable outcomes. MSIs prioritize student outcomes through programs that give primacy to student backgrounds. They also address local economic needs through curriculum focused on STEM, teacher education, and healthcare employment.

While MSIs share many similarities across category and sector in how they use their federal grant, there are notable and expected differences. This occurs mostly between sector and level, with exceptions. We would expect community college MSIs to focus on local workforce needs. PBIs largely reflect this. Building bridges to local high schools and community organizations is another reoccurring element in MSI two-year institutions. Yet the community focus also appears in four-year public schools, such as the University of Illinois, Chicago. It becomes clear through the project abstracts that most MSIs recognize they are institutions existing within communities that benefit from the college as much as the institution benefits from the community (Boland, 2018).

Title V funding leads to increase in college completion

For each college completion variable in every sector of higher education included in this study, institutions produced increases after receiving Title V funding as HSIs. This result varies based on each completion category and across race and ethnicity. When

assessing the total enrollment, Title V funding appears to have a statistically significant impact on associate's degrees and bachelor's degrees in private non-profit four-year HSIs. It is possible that MSI-funded programs and services generally target students of color. This would in part explain why the institution as a whole does not lead to increases in completion in all higher education sectors. That this study finds a relationship between this category of outcomes and HSI federal funding at all could indicate that benefits accrue to the entire institution and not just students of color.

The majority of Title V funding appears to be used to benefit Latino/a students. The results of this study wherein the outcome variables are disaggregated by Latino/a students seems to confirm that such an approach is successful. Increases were higher in both public and private four-year HSIs, with as much as a 12 percent increase in bachelor's degrees at the latter. Latino/a students showed an increase in all categories. This finding aligns with previous research into how HSIs serve their student populations (Nuñez and Elizondo, 2013). It suggests that such approaches to student success are effective, at least amongst this study's sample.

Another finding that demands more evaluation is increases in student completion amongst other racial and ethnic groups. Asian American and Pacific Islander students in particular benefitted within HSIs. This could be a function of this student population comprising a large share of full-time enrollment in many HSIs, particularly those located in California and New York. It is also plausible that Asian American and Pacific Islander students tend to graduate at higher levels than other racial and ethnic categories.

Amongst other racial and ethnic groups, Title V funding appeared to have some impact on Black and American Indian and Alaska Native students. Both tend to experience lower graduation rates in comparison to other racial and ethnic categories. While increases were relatively small, more research into the role that HSIs serve these students is vital in understanding the mechanism by which they benefit in terms of college completion.

The non-resident alien race/ethnic category as defined by IPEDS refers to numerous student populations. Other researchers have noted higher populations of immigrant students in HSIs, particularly along the border with Mexico in states such as Texas (Boland, 2017; Creusere, Fernandez, Fletcher, & Rice (2014). Several argue that HSIs have excelled in serving such immigrant students (Boland, 2017; Excelencia in Education, 2015; Fletcher & Webster, n.d.; Santiago, 2011). While this study cannot isolate the specific populations within the non-resident alien classification, it is possible that those completing at higher rates in HSIs are Latino/a immigrants. The high upward mobility rate found for community colleges including HSIs Glendale Community College would reflect this study's finding that there was a 9 percent increase in these students completing with a community college certificate.

El Paso Community College (EPCC) has distinguished itself for committing to student success. It has created numerous programs to improve course completion and facilitate transfer to a four-year institution. These include The College Readiness Initiative, the Pretesting Retesting Educational Program, Early College High Schools, and the Math Emporium (Gasman et al., 2013). EPCC has also entered a formal reverse

transfer agreement with the University of Texas at El Paso (UTEP). The "2+2 Degree Plan" allows students who have transferred to fulfill the requirements of their associate degree while completing the requirements for their bachelor's degree. Since both institutions formalized the program in 1996, reverse transfer students have earned 2,874 associate degrees and almost 2,000 bachelor's degrees (U.S. Department of Education, 2015).

Another example of how HSIs advance student success is Dodge City Community College in Dodge City, KS. This two-year HSI represents a comprehensive approach to increasing the number of certificate or degree completers. Their program, *Connecting to Success*, seeks to improve student success measures by targeting the root causes of low performance in those areas. The school employs a combination of services to increase the number of students obtaining a certificate or degree or transferring to a four-year school. These include academic tracking systems, additional advising for ESL students, and flipped classroom online and in-class activities (Boland, 2018).

Title III funding led to increase in college completion

Some caution is warranted when interpreting the results of the Title III analysis, as this includes several different categories of MSIs. This study acknowledges the heterogeneity of these institutions. Though they share a mission of serving traditionally underserved student populations, those particular student populations vary. These institutions likewise vary in their approach to using their Title III funding as MSIs. Common threads weave these institutions together, which provides some justification for including them in a single analysis. The use of a multiple-cutoff regression discontinuity

approach to Title III should allow for the statistical control of the heterogeneity between these types of MSIs and across sectors. Yet it is clear that these individual institutions serve students in various ways that could defy quantitative analysis.

The impact of Title III MSI funding for all students in the aggregate was more pronounced in community colleges. In particular, there was an increase eight percent in associate's degrees amongst the entire full-time student population. This could suggest that Title III two-year MSIs focus their federal funding on functions that relate to the entire school, such as technological innovation or distance education programs.

Throughout the racial and ethnic categories primarily served by Title III funding, much of the increases in completion measures occurred at the community college level. This could in part reflect the fact that many Title III MSI recipients are community colleges.

Though community colleges accounted for many of the increases in completion by race and ethnicity in relation to Title III, private four-year MSIs receiving Title III funding produced sizable increase in baccalaureate degree attainment. For example, there was an increase of 12 percent amongst Asian American and Pacific Islander students receiving bachelor's degrees. California and New York include most of the AANAPISIs in the U.S. Of this number, approximately half are smaller private, non-profit four-year institutions.

According to the U.S. Census, the Asian American and Pacific Islander population is predicted to increase to 40 million by 2050 (White House Initiative on Asian Americans and Pacific Islanders, 2014). Asian American and Pacific Islander

college enrollment is anticipated to increase by 35 percent over the next decade. There are approximately 1.2 million students attending AANAPISIs across the U.S. (APIACU, 2014). There are currently over 150 AANAPISIs in the U.S., representing 48 ethnicities and over 300 different languages (White House Initiative on Asian American and Pacific Islanders, 2014). Unlike most HSIs, many AANAPISIs do not realize they are an AANAPISI and are eligible for federal funding. Of the 150 eligible AANAPISIs, 78 applied for federal designation. Of those institutions, 14 percent received federal grants (CARE, 2012). Similar to many HSIs, an important role of AANAPISIs is serving immigrant students. Asian American and Pacific Islander students enrolled in AANAPISIs are more likely to be non-English speakers and immigrants (CARE, 2012). This is captured in this study's results. While increases were lower than other racial and ethnic populations, non-resident alien students increased between 1 and 2 percent in both public bachelor's degrees, associate's degrees, and community college certificates. Despite the current political tenor amongst federal lawmakers against certain populations of immigrants, significant growth in Asian American and Pacific Islander and Latino/a peoples will continue. This study provides potential evidence that MSIs provide a measurable benefit to these students.

An example of an AANAPISI program at a community college is at Evergreen Valley College in San Jose, CA. It proposed its Southeast Asian American Student Excellence (SEAASE) program to advance participation and completion amongst Vietnamese and other Asian American and Pacific Islander students. It lists amongst several detailed goals enrolling 1,500 new Southeast Asian American (SEAA) students

per year, boosting the retention rate from 62.9 percent to 75 percent, and increasing completion with the goal of 70 percent of Southeast Asian American students earning 40 credits, a certificate, or transferring to a four-year institution within two years of beginning the program.

While this study does not explore transfer, it remains a critical function for college completion. A specific MSI transfer program efforts is a cooperative grant between two ANNH institutions, the University of Hawai'i at Mānoa and the University of Hawai'i Maui College, titled *Kekaulike* ("to share equally, equality, equity, justice, mutual, to equalize, balance"). Amongst several goals, the program seeks to construct a "transfer bridge" between the two schools. To further this effort, the program also proposes providing additional academic support to those students interested in transferring (Boland, 2018).

As with many HSI programs, Title III MSI programs prioritize a holistic approach to student success. For example, the University of Alaska Southeast, Sitka Campus proposed a all-encompassing approach to fostering student success entitled "Complete to Compete: A Holistic Approach to Student Success for Alaska Native and High-Need Students." With "five goals and 28 measurable, realistic objectives drawn from locally-based needs assessment and strategic planning, a research-based logic model, and a strong external evaluation," the program seeks to prioritize student success while fostering a sense of "community and institutional identity" (Boland, 2018).

Another method MSIs use to support students is the development of a center to focus all MSI student-centered activities. For example, Augusta Technical College, a

two-year PBI in Augusta, GA, created the Center for Learning and Academic Support Services (CLASS). This center emphasizes the improvement of math and writing amongst students with the goal of increasing the school's retention rate as well as its graduation rate (Boland, 2018).

Another approach to advancing student success is pre-college outreach programs. The University of Minnesota, Morris uses summer bridge programs to increase access to their institution. Through the program "Morris Native American Student Success (NASS)," the four-year public NASNTI focuses in advancing the degree attainment of its Native American students. Chief amongst this effort is the expansion of the school's summer bridge program to ease transition to college through academic advising and peer mentors.

Title V leads to increase upward social mobility

The various project mechanisms and outcomes explored in this study connect to a broader product of students enrolling in and graduating from MSIs. As other researchers demonstrate, MSIs appear to be engines of upward social mobility. In their recent work on mobility in higher education, Chetty et al. include eight MSIs in their top ten colleges that showed substantial improvement in the social mobility of students of color and low-income students. In exploring the Chetty et al. study, Hillman (2017) examined the social mobility rates of institutions in the California State University system. The majority of these campuses are MSIs. Nearly half of students in some schools within the CSU system were found to rise in social mobility. Next to California, Texas is the state with the most MSIs. Boland found higher rates of upward social mobility in Texas MSIs compared to

those in California (Boland, 2017). This applied to both two and four-year MSIs in the state.

Clearly, California and Texas are key HSI states. Over 60 percent of Californian Latino college students attend an HSI. The state's HSIs also account for more than half of all higher education institutions in California. Given the size of the community college system, it should not be a surprise that nearly 80 percent of Latino students are enrolled in an HSI community college (Malcom-Piqueux, et. al., 2013). The growth of HSIs has occurred mostly due to their proximity to predominantly Hispanic neighborhoods. Low tuition also makes HSIs an attractive means of obtaining a college education. Thus, Latino students tend to enroll mostly in HSIs near their homes (Hispanic Association of Colleges & Universities, 2014).

Though they comprise some state flagship institutions (especially in California and Texas), the majority of HSIs are community colleges and less selective public four-year institutions. These are largely the workhorses of U.S. higher education. Broad access institutions (defined as those admitting more than 90 percent of those who apply) account for more than half of all postsecondary institutions in the U.S. As Chetty et al. (2017) found, many of these HSIs perform the function of providing an avenue for upward mobility for students of color.

As noted in the methods and results sections, data limitations restrict a proper analysis of exploring a potential causal relationship between Title III and upward mobility. Exploratory results indicate some potential for AANAPISIs to lead to an increase in upward mobility. Yet additional research is needed to better investigate any

relationship between Title III funding for MSIs and upward mobility. While college completion measures such as bachelor's and associate's degrees do not neatly align with mobility, the results from this study demonstrating a relationship between Title V and both completion and mobility could suggest such a relationship between Title III and those outcomes.

Contributions of this study

This study contributes to the research literature on MSIs, student success, and specific policies of the Higher Education Act by using an empirical research design to explore the relationship between assorted measures of student success and federal public policy interventions. This is the first study that the author is aware of to use a regression discontinuity design to estimate the relationship between Title V and Title III MSI policies and college completion and upward mobility outcomes across multiple MSI categories nationwide. The results of this study suggest that Title V and Title III do lead to increases in college completion outcomes. The results also indicate that Title V causes an increase in upward social mobility across different mobility measures. This study raises many more questions that demand future exploration.

Recommendations for Policy and Practice

It is impossible to predict the shape of federal funding for MSIs to come. Funding levels have not decreased significantly for any Title III or Title V category. Yet funding levels have also not increased significantly. While MSIs should continue to apply for competitive grants and eligible MSIs should especially apply, it is unrealistic to expect a federal windfall. Current federal proposals to institute a performance funding policy

aimed specifically at recipients of Title III and Title V funding would have a substantial impact on all U.S. MSIs. Yet an important lesson can be learned through a closer inspection of the evolution of federal legislation for MSIs. This evolution partly explains why each category of MSI is funded at different levels. The disparity in MSI funding per MSI classification is likely revealed through the politics of policymaking. HBCUs received federal policy recognition with the Higher Education Act of 1965. This resulted from decades of work on the parts of many fighting for this goal. HSIs grew from similar political struggle, as noted above. AANAPISIs and other MSI categories also found recognition, but only after political outreach. This topic demands additional research. Yet it appears that those institutions that form coalitions and form alliances with politicians stand a much better chance of receiving more federal funding.

It is critical for MSIs to forge alliances with state and federal policymakers. Numerous studies demonstrate the impact of policymaker influence on public policy for higher education (Ness, 2010; Tandberg & Griffith, 2013). MSI administrators should strive to boost their political capital by investing in outreach to politicians working within their respective districts. HBCUs and HSIs have excelled at developing relationships with politicians who have supported and advocated for these institutions at all political levels (Macdonald, Botti, & Clark, 2007). As the evolution of HBCUs and HSIs reveals, creating coalitions amongst institutions has been a critical step in advancing their causes (Boland, Gasman, Nguyen, & Castro Samayoa, 2015). Neither would have persevered had they not aligned with one another first and then sought to win influence within the federal political realm.

Another recommendation for institutions applying for a competitive MSI grant is to develop specific targets and explicit outcomes for their proposed MSI programs. The Department of Education does not offer information on how many of the project abstracts received funding for their institutions. The number of awards per year indicates that most do indeed gain federal funding. Yet it is imperative that MSIs comprehensively document precisely what they intend to do with the funding and what they hope to achieve through their federally funded programs. An emphasis on incentives-based funding and ROI reveal that quantifying inputs and outputs will be essential to a successful proposal in the years to come.

Finally, institutions that are designated as MSIs should look to their MSI programs as opportunities to scale up such programs. Many MSI programs exclusively target a specific population of students depending on the category of MSIs. Hence, not all enrolled students in the institution can benefit from the federally funded program. Yet there are lessons to be learned that could be applied to the entire school. Paramount among these is the approach towards ensuring success on the part of traditionally underserved student populations. This is an area at which MSIs have been shown to excel. All institutions of higher education can benefit the entire student body based on such best practices.

Recommendations for Future Research

There are three primary avenues for future research based on this study. First, little is known about how institutions go about creating project abstracts or constructing services based on the receipt of federal funding. Qualitative research can provide a

valuable function in interrogating how different categories of MSIs approach their project abstracts and decisions on what most necessitates the focus of the MSI grant. On the other side of the equation, no extant research has trained a lens on how the Office of Postsecondary Education reviews MSI project abstracts and makes decisions on awards. Either vantage point could contribute immensely to both researchers and practitioners.

Second, few studies have examined MSI outcomes across different MSI categories. Less have employed quasi-experimental quantitative research designs to estimate the relationship between the receipt of federal funding and outcomes such as degree completion or retention. As explained earlier, policymakers demand an evidence-based approach towards funding colleges and universities. As flawed as many of such funding mechanism have been throughout the states, the increasing popularity of pay-for-performance in higher education proves the necessity of demonstrating the impact of MSIs through rigorous research designs.

Third, research studies using different methodological strategies are necessary to analyze the potential relationship between the embrace of an MSI identity and student success. Researchers have only just begun exploring how institutions do and do not acknowledge their MSI status. Content analysis could be useful in exploring college promotional materials for an indication of whether or not they are an MSI. Quantitative studies could reveal potential causal links between such an embrace and outcomes.

Conclusion

As the number of MSIs continues to grow, it is important to assess how and how well these institutions serve their students. This study is one attempt to investigate the

approaches MSIs take to carry out their federally funded missions. These missions reveal what MSIs prioritize in forwarding programs to advance student progress. While MSI programs echo strategies to further student success throughout U.S. higher education, much remains to be learned about how specifically MSIs have and can continue to support students of color through the many layers of U.S. postsecondary education. The design of policies at the institutional and public levels must be informed by finer grained analyses of the architecture of MSI programs to meet current and future demands of higher education.

APPENDIX

Appendix A1:

Fuzzy regression discontinuity estimates of the effect of Title V on all races and all credentials, with Latino/a enrollment squared term, with Latino/a enrollment cubed term

	All races, all credentials, public four year	All races, all credentials, private four year	All races, all credentials, public two year	All races, bachelor's degrees, public four year	All races, bachelor's degrees, private four year	All races, associate's degrees, public two year	All races, certificates, public two year
HSI/Treatment	-1.7215	-7.3325***	-4.9704	-1.8921	-8.4563***	-7.8274	-3.8951
	0.9374	1.3183	3.0167	1.2191	1.5191	5.1936	3.6047
Latino/a Enrollment	4.9730**	10.7669***	10.7406*	4.5865*	10.6036***	16.2709	8.5253
	1.6233	1.5369	5.3176	2.1110	1.7710	9.1548	6.3540
Latino/a Enrollment-squared	-8.0118***	-7.8597***	-14.2038**	-7.5301***	-5.9878***	-18.9187*	-14.9553*
	1.5566	1.1952	5.2351	2.0242	1.3772	9.0127	6.2554
Constant	8.4347***	8.2113***	9.0304***	7.7695***	7.5429***	9.4971***	7.1901***
	0.4197	0.3766	1.4550	0.5458	0.4339	2.5049	1.7385
R-squared	0.0485	0.0001	0.0001	0.0321	0.0001	0.0001	0.0001

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

HSI/Treatment	-2.7791*	-8.3748***	30.6308	-2.2685	-8.8418***	40.9067	39.7752
	1.2990	1.5281	61.6218	1.6766	1.7060	80.9984	80.2448
Latino/a Enrollment	8.3757**	12.3605***	-62.8389	6.0320	10.8157***	-84.4747	-81.8426
	2.7836	2.1046	131.3431	3.5927	2.3496	172.6431	171.0368
Latino/a Enrollment-cubed	-15.2256***	-10.2449***	98.5944	-11.3057*	-6.1314*	135.4692	123.3148
	3.8496	2.4423	211.9428	4.9686	2.7266	278.5868	275.9947
Constant	8.6340***	8.0896***	-7.1678	7.6143***	7.2529***	-12.6528	-12.5681
	0.5666	0.4444	27.3019	0.7313	0.4961	35.8869	35.5530
R-squared	0.0174	0.0001	0.0001	0.0154	0.0001	0.0001	0.0001

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

Appendix A2:

Fuzzy regression discontinuity estimates of the effect of Title V on all races and all credentials, all races by sector, with Latino/a enrollment interaction term with HSI (treatment), Latino/a enrollment squared and interaction term with HSI (treatment), Latino/a enrollment interaction term with HSI (treatment) and cubed term

	All races, all credentials, public four year	**All races, all credentials, private four year**	**All races, all credentials, public two year**	**All races, bachelor's degrees, public four year**	**All races, bachelor's degrees, private four year**	**All races, associate's degrees, public two year**	**All races, certificates, public two year**
HSI/Treatment	-0.3132	-5.6196***	-0.8043	-0.5498	-0.9121	-2.1610	0.4664
	0.7332	1.1270	1.1833	0.9490	1.1662	2.0463	1.6490
Latino/a Enrollment	3.1732*	4.8303***	4.0627*	2.7918	2.2253	6.1729	1.7493
	1.2798	0.9667	2.0226	1.6565	1.0173	3.4977	2.8186
Latino/a Enrollment*HSI	-4.5083***	1.9574	-3.6210***	-4.1108**	2.2280	-2.2800	-4.3521***
	1.1580	1.0512	0.7912	1.4989	1.1062	1.3682	1.1026
Constant	7.6734***	6.5880	6.8447***	7.0322***	5.1482***	6.3409***	4.9407***
	0.2827	0.2201	0.4700	0.3659	0.6312	0.8127	0.6549
R-squared	0.0237	0.0001	0.0130	0.0161	0.0001	0.0001	0.0226

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

HSI/Treatment	-1.1081	-5.3343***	-3.1309	-1.0599	-6.1845***	-4.2690	-2.5949
	0.8413	1.0065	1.8206	1.0899	1.1410	2.9990	2.3602
Latino/a Enrollment	3.9559**	4.8078***	7.8044*	2.8485	4.0928***	9.9356	6.8265
	1.5103	0.9177	3.2169	1.9565	1.0404	5.2991	4.1703
Latino/a Enrollment-squared*HSI	-6.3451***	2.1423	-7.9604***	-4.8514*	4.6081**	-7.0651*	-10.4139***
	1.5730	1.2993	2.1817	2.0377	1.4730	3.5938	2.8283
Constant	7.8478***	6.5781***	7.7177***	7.0515***	5.8768***	7.2056***	6.1200***
	0.3329	0.2083	0.7432	0.4313	0.2362	1.2243	0.9635
R-squared	0.0234	0.0001	0.0001	0.0141	0.0001	0.0001	0.0001

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

HSI/Treatment	-1.1896	-5.5347***	-3.8807	-0.9662	-6.3465***	-5.5620	-3.6819
	0.8787	1.0433	2.3723	1.1390	1.1819	3.9214	3.0394
Latino/a Enrollment	3.7594***	5.4161***	8.9299*	2.2662	4.7581***	12.2079	8.5142
	1.5397	1.0101	4.2126	1.9958	1.1443	6.9634	5.3972
Latino/a Enrollment-cubed*HSI	-8.0449***	1.5776	-13.3980**	-5.3361*	4.6448**	-14.4835	-17.9658**
	2.0682	1.5976	4.6773	2.6808	1.8099	7.7315	5.9926
Constant	7.8077***	6.7081***	7.9794***	6.9287***	6.0187***	7.7249***	6.5109***
	0.3399	0.2286	0.9708	0.4405	0.2590	1.6047	1.2438
R-squared	0.0225	0.0001	0.0001	0.0121	0.0001	0.0001	0.0001

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

Appendix A3:

Fuzzy regression discontinuity estimates of the effect of Title V on Latino/a students and all credentials, all races by sector, with Latino/a enrollment squared term, with Latino/a enrollment cubed term

	Latino/a, public four year	**Latino/a, private four year**	**Latino/a, public two year**	**Latino/a, bachelor's degrees, public four year**	**Latino/a, bachelor's degrees, private four year**	**Latino/a, associate's degrees, public two year**	**Latino/a, certificates, public two year**
HSI/Treatment	-6.0138***	-10.7011***	-21.2698*	-5.8447***	-11.1046***	-19.2215*	-13.1095*
	0.9708	1.3911	8.6013	1.0522	1.4392	8.2315	5.6554
Latino/a Enrollment	21.7137***	22.7723***	48.4567***	20.4404***	21.2696***	43.8847**	31.8627***
	1.6812	1.6217	15.1615	1.8221	1.6779	14.5097	9.9688
Latino/a Enrollment-squared	-24.4064***	-17.7007***	-54.7213***	-23.1888***	-14.9569***	-48.2675***	-39.6096***
	1.6121	1.2611	14.9261	1.7472	1.3048	14.2844	9.8141
Constant	8.9014***	7.6204***	15.4747***	8.1926***	6.8531***	13.6094***	10.1469***
	0.4346	0.3973	4.1484	0.4711	0.4111	3.9701	2.7276
R-squared	0.4195	0.0001	0.0001	0.3438	0.0001	0.0001	0.0001

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

HSI/Treatment	-8.9374***	-14.0875***	123.4213	-8.0684***	-13.7193***	108.9232	95.3465
	1.5478	1.8502	244.7198	1.6149	1.8376	214.3512	189.0059
Latino/a Enrollment	31.2335***	28.9094***	-250.7215	27.9130***	25.8502***	-221.0893	-192.4558
	3.3169	2.5482	521.6050	3.4605	2.5308	456.8761	402.8541
Latino/a Enrollment-cubed	-44.9323***	-27.3287***	403.5995	-39.9952***	-22.0815***	357.6337	303.8801
	4.5871	2.9571	841.6916	4.7858	2.9369	737.2413	650.0685
Constant	9.3432***	7.8481***	-50.2227	8.3051***	6.9264***	-44.5662	-39.0343
	0.6751	0.5381	108.4248	0.7044	0.5344	94.9697	83.7403
R-squared	0.2064	0.0001	0.0001	0.1688	0.0001	0.0001	0.0001

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

Appendix A4:

Fuzzy regression discontinuity estimates of the effect of Title V on Latino/a students and all credentials, all races by sector, with Latino/a enrollment interaction term with HSI (treatment), Latino/a enrollment squared and interaction term with HSI (treatment), Latino/a enrollment interaction term with HSI (treatment) and cubed term

	Latino/a, public four year	**Latino/a, private four year**	**Latino/a, public two year**	**Latino/a, bachelor's degrees, public four year**	**Latino/a, bachelor's degrees, private four year**	**Latino/a, associate's degrees, public two year**	**Latino/a, certificates, public two year**
HSI/Treatment	-1.8551*	-7.6633***	-5.1786**	-1.8959*	-8.2991***	-4.9432**	-1.5274
	0.7792	1.1692	1.7102	0.8405	1.1860	1.8284	1.3415
Latino/a Enrollment	16.9593***	13.9057***	22.3089***	15.9363***	12.4671***	19.9508***	13.6066***
	1.3601	1.0030	2.9233	1.4671	1.0173	3.1252	2.2931
Latino/a Enrollment*HSI	-14.6264***	-1.9036	-13.0615***	-13.9127***	0.2282	-9.6826***	-10.8721***
	1.2306	1.0906	1.1435	1.3274	1.1062	1.2225	0.8970
Constant	6.7357***	4.9121***	6.9685***	6.1376***	4.2889***	5.9293***	4.1263***
	0.3005	0.2284	0.6793	0.3240	0.2316	0.7262	0.5328
R-squared	0.3728	0.0001	0.1339	0.2978	0.0001	0.0001	0.3453

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

HSI/Treatment	-4.3063***	-8.0688***	-14.0418***	-4.0019***	-8.3484***	-12.0412**	-8.8390**
	0.9296	1.0724	4.3809	0.9958	1.0713	4.0895	3.1343
Latino/a Enrollment	19.1082***	14.2645***	36.8358***	17.2906***	12.6816***	31.8739***	25.5542***
	1.6688	0.9778	7.7408	1.7876	0.9768	7.2258	5.5381
Latino/a Enrollment-squared*HSI	-20.0302***	-2.5921	-30.2175***	-18.0719***	-0.0780	-24.0847***	-24.9418***
	1.7381	1.3844	5.2498	1.8618	1.3830	4.9005	3.7560
Constant	7.2185***	4.9938***	10.3485***	6.4501***	4.3342***	8.6935***	6.9074***
	0.3679	0.2220	1.7884	0.3940	0.2217	1.6694	1.2795
R-squared	0.3218	0.0001	0.0001	0.2512	0.0001	0.0001	0.0001

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

HSI/Treatment	-4.4520***	-8.5099***	-17.1392**	-3.9690***	-8.7469***	-14.9715*	-11.2274*
	0.9789	1.1228	6.3365	1.0479	1.1226	5.9125	4.5253
Latino/a Enrollment	18.1791***	15.1625***	41.6181***	15.9968***	13.6294***	36.6219***	29.1603***
	1.7152	1.0871	11.2519	1.8361	1.0869	10.4991	8.0357
Latino/a Enrollment-cubed*HSI	-24.8135***	-5.0884**	-51.8961***	-21.5284***	-1.9451	-43.2698***	-42.1405***
	2.3039	1.7193	12.4932	2.4663	1.7191	11.6573	8.9222
Constant	7.0259***	5.1865***	11.4566***	6.1793***	4.5373***	9.7878***	7.7452***
	0.3786	0.2460	2.5930	0.4053	0.2460	2.4195	1.8518
R-squared	0.3100	0.0001	0.0001	0.2392	0.0001	0.0001	0.0001

Note: Clustered standard errors in parentheses.
**p< .05 **p< .01 ***p< .001*

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